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DOCUMENTATION FOR THE EVALUATION OF THE WATER RESOURCES CENTER FY1975-FY1984

Robert C. Stiefel
Director

Evaluation Team

James R. Blakey
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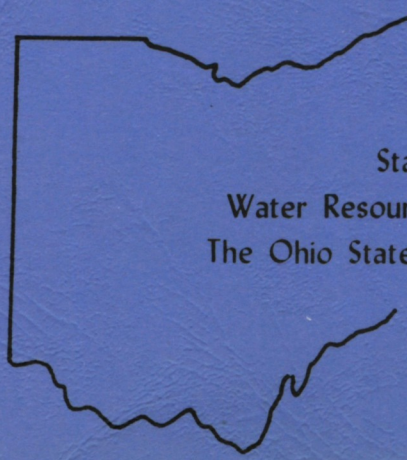
United States Geological Survey
Department of the Interior



State of Ohio
Water Resources Center
The Ohio State University

BRIEFING DOCUMENT

for the

ON-SITE EVALUATION

of the

WATER RESOURCES CENTER
THE OHIO STATE UNIVERSITY

by the

GEOLOGICAL SURVEY
U. S. DEPARTMENT OF THE INTERIOR

OCTOBER 23-25, 1985

Review Panel Members:
Mr. James F. Blakey, Chairman
Dr. Robert D. Varrin
Dr. Marion T. Loftin
Dr. John F. Estenik
Mr. Jack Frost
Dr. Madge Ertel, Executive Secretary

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DIRECTOR'S STATEMENT

This report was prepared to document the accomplishments of the Water Resources Center at The Ohio State University for an on-site evaluation by an external team of reviewers from the United States Geological Survey. The report covers the last ten fiscal years (1975-1984) and provides an in-depth analysis in ten areas of interest related to program quality, relationships and activities.

The federal support provided by the Geological Survey in the U. S. Department of the Interior is primarily directed at water resources research needs, but the Program's components closely paralleled the mission of the University in terms of education, research and public service.

The Advisory Committee to the Water Resources Center has done an excellent job in establishing high standards for the conduct of the research completed in this Program and in the selection of suitable and relevant research topics. Of the forty-two projects completed in this Program during the past ten years,all but one have produced a project completion report, and over eighty-five percent have published at least one article in a refereed scientific or technical journal. All of the projects were conducted in topics that are relevant to the State's needs, and have provided a significant level of training for students. These projects were conducted by fifty-five principal investigators representing thirteen academic disciplines at ten universities and colleges in the State.

The Program has provided training for one-hundred-twenty students, including twenty at the Bachelors level, seventy at the Masters level and twenty-six at the Doctoral level. Collectively the students are from twwenty-three academic disciplines from eleven universities in the State. Their work has resulted in the publication of thirty-eight theses and twenty-four dissertations. Approximately one-third of the graduates now work in a water related field in the public sector, another quarter works in the private sector and the rest are equally divided as faculty members or Ph.D. candidates in the academic sector.

The support provided by the Universities to the program is very good, and there are adequate resources and services to conduct an effective Program.

Information transfer is provided, but the Center does not have any information transfer specialist on its staff. This component of the Program is the one area which could and should be strengthened.

INTRODUCTION

A. PURPOSE

The Water Resources Research Act of 1984 (P.L. 98-242), which reauthorized the state water resources research institute program, requires that each of the existing 54 Institutes be evaluated periodically to ascertain their eligibility to continue to receive annual program grants from the Geological Survey in the U. S. Department of the Interior. These evaluations are to determine "that the quality and relevance of an Institute's water resources research program, and its effectiveness as an institution for planning, conducting and arranging for research warrants its continued support in the national interest."

Beyond this legislative goal, however, the U.S. Geological Survey (USGS) views the process as a means by which the overall quality of the Institute program can be improved by providing incentives for a high quality of performance and by recognizing and improving areas of potential weakness at Institutes which do not meet the evaluation teams' expectations.

B. THE EVALUATION TEAM

The types of persons who are serving on the evaluation team were specified in the federal legislation. They include (1) an employee of the Department of the Interior (this will be a USGS District Chief who will serve as the chair of the team); (2) the Director of another Institute; (3) an administrator or faculty member from another university; (4) a representative from a State or local water resources agency; and, (5) a private citizen. Persons from the first three categories will each serve on several evaluation teams and were selected by the USGS. Persons in the last two categories are to be from Ohio and were selected by the USGS from qualified candidates nominated by the Ohio USGS District Chief and by the Director of the Water Resources Center, respectively. Each team is being accompanied by Dr. Madge Ertel of the Institute Program Office of the USGS in Reston, Virginia, who is serving as the Executive Secretary for the entire evaluation program.

A list of the members of the Evaluation Team is included as Attachment No. 1 at the end of this Chapter.

C. THE EVALUATION ELEMENTS

The aspects of the Center's program activities and performance which are to be considered by the evaluation team in developing their findings include:

1. Research quality
2. Research relevance
3. Research coordination
4. Information transfer
5. Training
6. University's accreditation
7. University's physical resources
8. Interdisciplinary relationships
9. Administrative relationships
10. Institutional commitment

The documentation for the Center's activities and accomplishments and the University's role and commitment in these ten areas for at least the past four years are contained in separate Chapters (in this same sequence) in this Briefing Document. In several instances, however, the Center's activities and accomplishments for the last ten years have been documented to provide the necessary background material to the Center's current activities.

The Appendix to this Document consists of a one or two page summary for each of the forty-two research projects that have been supported through the Annual State Water Resources Research Program of the Center during the period between Fiscal Year 1975 and Fiscal Year 1984. These summaries have been prepared from the project files and from data provided by the principal investigators. Information contained in these summaries includes the names, disciplines, levels of training, and the titles of the theses and dissertations of the students supported by these projects; citations for some of the publications and presentations that resulted from these projects; and, where available, the current employment record of the students that worked on these projects. Similar project summaries are also contained in the Appendix for the fifteen Matching Grant Projects that were supported by the U. S. Department of the Interior during the same ten year period.

D. SCHEDULE OF ACTIVITIES.

The Evaluation Team will be meeting with several groups of people from The Ohio State University and related institutions in the State as they examine the effectiveness of the Center's program within the context of our operation at the University. Meetings have been scheduled on Thursday, October 24, 1985, with the Center's Director; the Center's Advisory Committee; a group of the University's Administrators; the President of the University; and, with the Directors and Leaders of the water-related Programs, Centers and Agencies with which the Water Resources Center has developed cooperative and working relationships. The schedule for these meetings is included as Attachment No. 2 at the end of this Chapter.

The membership list of the Water Resources Center Advisory Committee is shown on Attachment No. 3, and the listings of the OSU Administrators and the Directors of the Cooperating Programs are shown on Attachments No. 4 and 5, respectively.

The Evaluation Team will informally present their findings and recommendations in separate meetings with the Institute Director and with the University Administrators having a direct responsibility for the Program on the morning of Friday, October 25. Their written report, which is to document the team's recommendations on the eligibility of the Center for continued support through this program, will be submitted to the USGS within the following ten days.

EVALUATION TEAM MEMBERS

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United States Geological Survey
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PROGRAM EVALUATION

Water Resources Center
The Ohio State University

Schedule of Activities

October 23-25, 1985

Wednesday **October 23, 1985**		
4:30 - 6:00pm	Informal Program Preview and Reception Fawcett Center	
6:00 - 8:00pm	Evaluation Team Dinner and Preliminary Meeting Fawcett Center	Blakey, Ertel, Estenik, Frost, Loftin, Varrin
Thursday **October 24, 1985**		
8:00 - 10:00am	Meeting with Robert Stiefel Director Water Resources Center Engineering Conference Room 143 Hitchcock Hall	Stiefel
10:00 - 11:00am	Meeting with WRC Advisory Committee Civil Engineering Conference Room 426 Hitchcock Hall	Water Resources Center Advisory Committee
11:15 - 11:30am	Meeting with Edward Jennings President The Ohio State University 205 Bricker Hall	Jennings
11:45 - 1:30pm	Lunch and Meeting with Ohio State University Administrators Faculty Club	Glower, Hollander, Leitzel, Redmond, Sierakowski, Sweeney, Ventresca
1:45 - 2:45pm	Tour of Water Resources Center- Informal Meetings with Faculty and GRA's	Fan, Rubin, Whitlatch, GRA's
3:00 - 4:30pm	Meeting with Program Cooperators Bio-Science Conference Room 609 Bio-Science Building	Bedford, Davis, Dugan, King, Margraf, Mattox, Nolte, Reutter, Rubin, Swisshelm, Ventresca

4:00 - 5:30pm	Other Meetings as Requested by Evaluation Team	Blakey, Ertel, Estenik, Frost, Loftin, Varrin
6:30 - 8:30pm	Evaluation Team Dinner and Meeting Fawcett Center	Blakey, Ertel, Estenik, Frost, Loftin, Varrin

Friday
October 25, 1985

9:00 - 10:00am	Exit Interview with Director Water Resources Center Engineering Conference Room 143 Hitchcock Hall	Stiefel
10:00 - 11:00am	Exit Interview with Ohio State University Administrators Engineering Conference Room 143 Hitchcock Hall	Glower, Hollander Redmond, Sweeney

WATER RESOURCES CENTER ADVISORY COMMITTEE

COLLEGE OF ENGINEERING

1. Dr. Vincent T. Ricca
   Civil Engineering

2. Professor Edwin E. Smith
   Chemical Engineering

3. Dr. Robert C. Stiefel
   Director
   Water Resources Center

4. Dr. Brian Wilde
   Metallurgical Engineering

School of Architecture

5. Dr. Steven I. Gordon
   City and Regional Planning

COLLEGE OF BIOLOGICAL SCIENCES

6. Dr. Robert M. Pfister
   Microbiology

7. Dr. Jeffrey Reutter
   Lake Erie Programs

8. Dr. William DeMott
   Zoology

9. Dr. David Culver
   Zoology

10. Dr. F. Joseph Margraf
    Ohio Cooperative
    Fisheries Unit

COLLEGE OF MATHEMATICAL AND PHYSICAL SCIENCES

11. Dr. Garry McKenzie
    Geology and Mineralogy

COLLEGE OF AGRICULTURE

12. Dr. Terry J. Logan
    Agronomy

13. Dr. Melville Palmer
    Agricultural Engineering

School of Natural Resources

14. Dr. Robert L. Vertrees
    Resources Management

COLLEGE OF MEDICINE

15. Dr. John R. Wilkens, III
    Preventive Medicine

ADMINISTRATIVE MEMBER

16. Mr. McIver C. Woody
    Ohio State University
    Research Foundation

OHIO ENVIRONMENTAL PROTECTION AGENCY

17. Dr. John F. Estenik

OHIO DEPARTMENT OF NATURAL RESOURCES

18. Dr. William Mattox

UNITED STATES GEOLOGICAL SURVEY

19. Mr. Steven Hindall
    District Chief

WATER RESOURCES CENTER

UNIVERSITY ADMINISTRATORS

Dr. Edward H. Jennings
President
The Ohio State University

Dr. Jack M. Hollander
Vice-President for Research & Graduate Studies

Dr. Donald D. Glower, Sr.
Dean, College of Engineering

Dr. Joan Leitzel
Assoc. Provost, Office of Academic Affairs

Dr. Kenneth W. Sloan
Director, Sponsored Programs Administration

Dr. Thomas L. Sweeney
Assoc. Vice-President for Research & Graduate Studies

Dr. Robert F. Redmond
Director, Engineering Experiment Station

Dr. Robert L. Sierakowski
Chairperson, Department of Civil Engineering

Ms. Jo Ann Ventresca
Assistant Director
Sponsored Programs Administration

WATER RESOURCES CENTER

PROGRAM COOPERATORS

Dr. Keith W. Bedford
Professor of Civil Engineering
Director, Coastal Engineering Program

Dr. Craig Davis
Director, School of Natural Resources

Dr. Patrick R. Dugan
Professor of Microbiology
Chairman, Committee on Marine Science

Dr. Charles C. King
Director, Ohio Biological Survey

Dr. Francis J. Margraf
Leader, Ohio Cooperative Fishery Unit

Dr. William Mattox
Division of Water
Ohio Department of Natural Resources

Dr. Byron H. Nolte
Professor of Agricultural Engineering
Ohio Cooperative Extension Service

Dr. Jeffrey M. Reutter
Acting Director, Center for
Lake Erie Area Research (CLEAR)
Stone Lab/ Sea Grant

Dr. Alan Rubin
Professor of Civil Engineering
Coordinator for Water Chemistry Program

Mr. Richard Swisshelm
Supervisory Hydrologist
Ohio District, USGS

Ms. Jo Ann Ventresca
Sponsored Project Administrator

CHAPTER 1

RESEARCH QUALITY

No absolute scale of quality exists against which to compare a research project to determine its scientific value, so other parameters must be used when making these types of judgments. One of the more significant indicators of research quality is the professional reputations of the principal investigators as determined by their peers and colleagues. The stature of individual researchers can be documented by evidence of publications in peer reviewed journals, invited presentations at scientific meetings, leadership roles in scientific and professional societies, awards for scientific achievements and sponsor's support for their research proposals. By the same measure, the results of a well conducted research project should be of a quality suitable to be published in a refereed technical or scientific journal.

Another important indication of the quality of a research project is found in the preparation of Masters theses or Doctoral dissertations related to the project objectives. Apart from the value of the student training provided by these activities, little other research is scrutinized as fully as to its value and quality as a graduate student's defense of a thesis or dissertation before a panel of senior faculty researchers.

While selecting projects to include in the State Water Resources Research Program, the Water Resources Center's Advisory Committee carefully evaluated the qualifications of each principal investigator. The Committee stipulated that only full-time faculty researchers from qualified programs at universities and colleges in the State would be eligible to participate in the program, and they further insisted that the principal investigators be active participants in the projects and be able to demonstrate a commitment of time and effort to the proposed work. They also required that student training be a pre-requisite to granting support to any proposed project. Thus, the Committee initially set the type of performance standards that would ensure high quality in the research conducted in this Program.

In the ten year period between Fiscal Year 1975 and Fiscal Year 1984, the Water Resources Center has provided support for forty-two research projects through the Annual State Water Resources Research Program. All of these projects have been conducted under the direct supervision of a full-time faculty researcher at a college or university in Ohio, and all of these projects provided a significant degree of training to one or more students.

Project completion reports have been published and distributed by the Water Resources Center and have been submitted to the U. S. Department of the Interior for all but one of these projects for which a report was required. In addition, at least one article has been published in a refereed technical or scientific journal for nearly 85 percent of these projects.

Doctoral dissertations and Masters theses have resulted from the research conducted on thirty-five of the projects, and others are nearly completed on four of the projects that were scheduled for completion less than one month ago. One project was conducted in a department that has only a non-thesis option available for its graduate students, and another project was conducted at a qualified research laboratory in a college that does not grant graduate degrees. Student training, however, was provided on all forty-two of the projects.

A total of thirty-eight Masters theses and twenty-four Doctoral dissertations have been or will be produced from the support provided by the Annual State Water Resources Research Program to these forty-two projects.

During this same ten year period, funding from the U. S. Department of the Interior was provided to an additional fifteen projects in Ohio through the Matching Fund Program. Completion reports have been published by the Water Resources Center for all of these projects as have articles in refereed scientific and technical journals.

While student training was to be considered in the selection of the Matching Fund proposals submitted through the Center to the Interior Department, it was not a pre-requisite in the selection process. However, graduate students were included on each project, and their efforts resulted in the development of 15 Masters theses and 11 Doctoral dissertations.

Over fifty-six faculty researchers representing fifteen disciplines at eleven colleges and universities in Ohio have served as principal investigators on the fifty-seven projects that were funded through the Water Resources Center during this ten year period. All but one of these people are still actively involved in some phase of academic life or have been granted an emeritus rank by their home universities. Several have advanced to positions as Chairs of Departments, Deans of Colleges, or Directors of other university-related research centers. To the best knowledge available at the Center, all but one of these Principal Investigators have been granted tenure by their Universities.

While documentation about the academic honors, scientific awards and leadership roles in scientific and professional societies that these researchers have garnered is not provided in this report, the granting of tenure and the professional advancement of these researchers are of themselves excellent indicators of the collective quality of the people who have participated in the programs of the Water Resources Center.

CHAPTER 2

RESEARCH RELEVANCE

During Fiscal Year 1981, the Water Resources Center with the cooperation of the water-related state and federal agencies, state officials and individuals in Ohio prepared and published a report entitled "Five-Year Water Resources Research and Development Plan: Fiscal Years 1982-1986." The major reasons for preparing this report were to develop a prioritized list of Ohio's water problems and to direct the research efforts supported by the Water Resources Center towards solutions in these problem areas.

Shortly after this Five-Year Plan was completed, the Directors of the seven Institutes in the Great Lakes, Upper Mississippi, and Ohio River Basins met to define the research needs in the water resources area for this Region. This analysis was made by selecting and ranking problem areas and research needs that had been identified in several of the State reports for the Region. For the next several years, the federal guidelines from the Interior Department required that research projects selected by the Center for the Annual State Water Resources Research Program be responsive to the Regional priorities.

Dr. Robert L. Vertrees, Professor of Resources Policy in the School of Natural Resources at The Ohio State University and a member of the Center's Advisory Committee, has prepared an analysis to show the relationships that exist between the functions served by the water research projects conducted at the Center when compared to a standardized list of water problems. The standardized list of problems is one that Dr. Vertrees has developed and is based on the functional use of the resource and not on a "laundry list" of water-related problems. Figure 1 is a matrix that has been developed that shows both the problems described in terms related to the use of water and the functions served by water resources research.

The results of Dr. Vertrees analysis is included on the Project Summaries in the Appendix to this document. For each project, Dr. Vertrees has identified both the Problem Area considered and the Research Area(s) addressed by the project. In addition, Figure 1 also contains the number of projects conducted for the Center during the past ten years by Problem Area and Research Area(s). The numbers in parentheses represent those projects conducted on a given water problem (row) that covered two or more functions served by water resources research (columns).

Based on Dr. Vertrees study, each project in both the Annual State Water Resources Research Program and in the Matching Fund Program was then compared to the prioritized list of Ohio's water problems that was included in the Five-Year Plan. Some research projects are, by their design, directed at solving more than one problem; and will, therefore,

be listed in two or more problem areas. Each Project Summary also contains the identifying number(s) for the State Prioritized Problem Area(s) that the project addressed.

The number of projects that have been supported through the Water Resources Center during the past ten years that were responsive to the prioritized list of the State's water problems is shown in the following tabulation. All projects were responsive to at least one problem area, and well over ninety percent of the projects were directed at the top seven problem areas.

	STATE PRIORITIZED PROBLEM AREAS	NUMBER OF PROJECTS
1.	Pollution from Diffuse Sources	17
2.	Contamination of Drinking Water	1
3.	Toxic and Hazardous Waste Disposal	8
4.	Pollution from Point Sources	10
5.	Impacts of Flooding and Drainage	2
6.	Impacts of Water Resources Developments	6
7.	Instream Flow Needs	14
8.	Impacts of Synthetic Fuel Development	2
9.	Impacts of Atmospheric Pollution	1
10.	Allocation of Water Resources	2

Totals
(A's
B's, FY81-85)

PROBLEMS WITH THE FUNCTIONAL USE OF WATER RESOURCES (Intermediate Level of Classification)			FUNCTIONS SERVED BY WATER RESOURCES RESEARCH (Second Intermediate Level of Classification)																													TOTAL OF ALL CLASSIFICATIONS
			R1. Problem-Identifying Research (Required to Understand the Nature and Extent of Problems with the Functional Use of Water Resources)											R2. Problem-Solving Research (Required During Various Stages of the Process of Arriving at Workable Solutions to Problems with the Functional Use of Water Resources)																				
			R1.a. Water in Nature		R1.b. Human Influences Upon Water Resources							R1.c. Influences Upon Health of Organisms and Substances in Water				R2.a. Develop Data Bases and Planning Methods			R2.b. Identify and Develop Alternatives			R2.c. Provide Information Required When Choosing Among Alternatives and Implementing Chosen Alternatives							R2.d. Transfer of Research Results		
			(1) The nature of water as a chemical compound.	(2) The water cycle.	(1) Effects on water resources of man's non-water activities.	(2) Effects from meeting demands for specific or multiple uses.	(3) Effects from controlling excess water.	(4) Effects from conserving water.	(5) Effects from pollutants.	(6) Effects of pollution control techniques.	(1) Transmitted in drinking water supplies.	(2) Transmitted in food and beverages.	(3) Transmitted when water resources are used for body-contact recreation.	(4) Transmitted by insects and other animal vectors.	(1) Design and operation of water resources data networks.	(2) Development of general approaches to water resources planning.	(3) Development of specific techniques of water resources planning.	(1) Alternatives classified by types of functional problems addressed.	(2) Structural alternatives (engineering works): detailed aspects.	(3) Nonstructural alternatives: specific types.	(1) Impacts of proposed or existing alternatives.	(2) Acceptability of proposed or existing alternatives.	(3) Operation and management of governmental projects.	(4) Administration of governmental programs which implement nonstructural alternatives.	(5) Coordination of governmental projects, programs, and agencies.	(6) Coordination of the governmental and private sectors.	(7) Meeting the manpower needs of government and the private sector.	(1) Development of systems to further the understanding and implementation of scientific and technical information.	(2) Transfer of technology through demonstration projects and other developmental activities.	
PI. WATER QUANTITY																																
PI.A.	Meeting Demands for Specific Uses					1									1	1	1	2		1(1)												7(1)
PI.B.	Controlling Excess Water and the Damages It Causes														1																	1
PI.C.	Conserving Water and Developing Contingency Plans for Droughts																															0
PII. WATER QUALITY																																
PII.A.	Controlling Pollution from Point Sources				(1)				2	1								7	(1)	(2)												10(4)
PII.B.	Controlling Pollution from Diffuse Sources				1				4							2		4		(1)	(1)											11(2)
PII.C.	Controlling Pollution from Atmospheric Sources																															0
PII.D.	Controlling Pollution from the Transporting and Dumping of Hazardous, Toxic, or Solid Wastes																															0
PIII. ALLOCATING WATER																																
PIII.A.	Intra-Basin Transfers of Water are Involved																															0
PIII.B.	Inter-Basin Transfers of Water are Involved																															0
PIV. CONTROLLING IMPACTS UPON LAND RESOURCES																																
PIV.A.	Impacts Upon Critical or Fragile Areas					1																				1						2
PIV.B.	Impacts from the Disposal of Dredged Materials																															0
PIV.C.	Impacts from the Disposal of Residuals from Wastewater Treatment								1																							1
PIV.D.	Impacts from the Construction and Operation of Structural Water Resource Developments																		1		1		1									3
PIV.E.	Impacts from Nonstructural Means of Managing Water Resources																															0
PROBLEMS THAT CROSS TWO OR MORE CLASSIFICATIONS																																
PI.	General Water Quantity															1																1
PII.	General Water Quality			4					6						2	1	1	2		(1)												16(1)
PI. & PII.	General Water Quantity and Water Quality			1												1		1		(1)												3(1)
PI.-PIV.	Applicable to All Problem Classifications																1															1
TOTAL OF ALL CLASSIFICATIONS			0	5	1(1)	2	0	0	13	1	0	0	0	0	4	6	3	16	1(1)	1(6)	1(1)	0	1	0	0	1	0	0	0			56(9)

CHAPTER 3

RESEARCH COORDINATION

During Fiscal Year 1981 the Water Resources Center, with cooperation from several water-related agencies, officials and individuals in the State, developed and published a five-year water resources research plan for the Center. The report, which contains a prioritized ranking of Ohio's water problems, is included as an Addendum to this Briefing Document.

Subsequently, the Director's of the seven Water Resource Research Institutes in the Great Lakes, Upper Mississippi and Ohio River Basins met to identify from their state five-year plans the water resource research priorities for this Region. These Regional Priorities became the basis for the solicitation and selection of projects for the Annual State Water Resources Research Program for the period between FY1982 - FY1985.

The procedures that were followed for the development of the FY 1985 Program and for the management of the research work being conducted on that Program have been reproduced from the Program Application and are included at the end of this Chapter. The complete Program Application will be available to the Evaluation Team members at the time of the on-site visitation.

The Water Resources Center has always attempted to involve other Universities and Colleges within the State in its programs. Announcements of the availability of funds from the Interior Department to conduct water-related research is routinely sent to around 250 qualified faculty researchers and research administrators at over forty private and state supported universities within the State.

During the past ten years, one-third of all the projects funded through the Center have been conducted at Universities other than Ohio State. These include the University of Bowling Green State University (1), Akron (2), Case Western Reserve University (6), Cleveland State University (1), the University of Dayton (2), Heildelberg College (1), Kent State University (1), the Medical College of Ohio (3), Ohio University (1), and Wright State University (1).

As a focal point for water resources research on the campus of The Ohio State University, the Water Resources Center has been successful in developing and coordinating support for water-related research from the private sector and from local, state, regional and federal funding agencies. The role of the Center is that of a facilitator of research and not necessarily that of a contractor. Funds generated by this type of research in terms of faculty salaries and release time, student support, materials and equipment, and indirect costs are returned to the University's general fund and to the Principal Investigator's academic

department, and do not directly benefit the Center's programs. As is often the case in this type of role, the Center provides the initial contact between a potential sponsor and a qualified researcher on the campus, and then has little further involvement with the development, implementation and completion of the project.

Some of the research projects that the Center has fostered during the past ten years are shown in the following list of research projects. Several of these projects are regional in scope and were developed through cooperative efforts with Water Resources Research Institutes in the Great Lakes, Upper Mississippi and Ohio River Basins.

"Demonstration Program in the Use of Calcium Fluoride in Fluoridating a Water System," Centers for Disease Control, PHS, DHHS, three years, 1985-1988; A. J. Rubin and R. C. Stiefel

"Optimization of Surfactant-Aided Desorption Techniques," U. S. Environmental Protection Agency, two years 1985-86; A. J. Rubin.

"Kinetics of Chloramine Inactivation of Giardia Cysts," U.S. Environmental Protection Agency, two years 1985-86; A. J. Rubin.

"Screen Water Filtration Device for Amoebicidal Properties," U. S. Army Natick R & D Command (subcontract to Univ. of New Hampshire), one year 1984-85; A. J. Rubin.

"Dynamics of Bioavailable Phosphorus in Lake Erie as Related to Phosphorus Loading," NOAA, two years 1983-85; R. C. Stiefel. (CLEAR).

"To Screen Experimental Iodine Water Purification Compounds," U.S. Army Natick R & D Command (subcontract to Univ. of New Hampshire), two years 1983-1985; A. J. Rubin.

"TCM Replacement," U.S. Army Natick R & D Command, two and one-half years. 1981-1983; A. J. Rubin.

"Disinfection of Giardia Lamblia Cysts with Chlorine, Chlorione Dioxide and Ozone," U. S. Environmental Protection Agency, three years 1980-1983; A. J. Rubin.

"Analysis and Evaluation of Water Quality Data and Monitoring System Efficiency and Utilization in the Ohio River Basin," U. S. Geological Survey, two years 19.80-1982; R. C. Stiefel, E. E. Whitlatch, R. M. Sykes, V. T. Ricca.

"Full-Scale Field Demonstration of Unheated Anaerobic Contact Stabilization," U.S. Department of Energy. two years 1980-1982; R. M. Sykes.

"Lake Erie Monitoring Program: Main Lake Water Quality and Cladophora", U. S. Environmental Protection Agency, one year 1980-

1981; R. C. Stiefel. (CLEAR).

"Limnological Investigations of Water Quality and Fish Larvae in Lake Erie", U. S. Environmental Protection Agency, one year 1979-1980; R. C. Stiefel. (CLEAR).

"Startup: Full-Scale Field Demonstration of Unheated Anaerobic Contact Stabilization," City of Columbus, Ohio, one year 1979-1980; R. M. Sykes.

"Lake Erie Water Quality Surveillance-Nearshore," U. S. Environmental Protection Agency, two years 1978-1980; R. C. Stiefel. (CLEAR).

"A Study on the Probable Effluents from Synfuel Plants Using Ohio River Region Coals," Ohio River Basin Commission, two years, 1978-1980; R. C. Stiefel.

"Lake Erie Nearshore Surveillance Program. Western Basin," U. S. Environmental Protection Agency, two years 1978-1979; R. C. Stiefel. (CLEAR).

"Screen Prospective TCM Replacements for Amoebicidal Properties," U. S. Army Natick R & D Command, three years 1977-1980; A. J. Rubin.

"Integration and Synthesis of Watershed Studies on the Effects of Land Use on Pollution Loadings to Lake Erie", United States Environmental Protection Agency, one year 1977-1978; R. C. Stiefel.

"Dissolved Oxygen Measurements in Ohio Streams During Urban Runoff," United States Environmental Protection Agency, two years 1977-1978, R. C. Stiefel.

"Recovery of Ultrafine Coal Particles by Microflotation," Department of Energy, one year 1977-78; A. J. Rubin.

"Elimination of Filamentous Blue-Green Algae at the Southerly Sewage Treatment Plant" City of Columbus, Ohio, five years 1976-1981; R. M. Sykes.

"Assessments of Impacts of Energy Conversion Facilities on the Environment of the Ohio River Basin," United States Environmental Protection Agency, two years 1976-1978, R. C. Stiefel.

"Removal of Sulfides by Catalytic Oxygenation," The Ohio State University Graduate School, one year 1974-1975; A. J. Rubin.

"Maumee River Pilot Watershed Study," United States Environmental Protection Agency, three years 1974-1978; T. J. Logan.

"Field and Laboratory Study of the Treatability of a Non-Ionic Surfactant", Procter and Gamble Co., one year 1974-1975; A. J. Rubin.

"Biodegradation of Disposable Diaper Wadding in Septic Tanks," Proctor and Gamble Co., one year 1973-1974; R. M. Sykes.

"Lake Erie Nutrient Control Assessment", United States Environmental Protection Agency, three years, 1973-1976, R. C. Stiefel. (CLEAR).

PROGRAM MANAGEMENT DESCRIPTION

Program Announcement/Research Priorities

A call for pre-proposals for the Fiscal Year 1985 State Water Resources Research Program was sent to research administrators and qualified faculty investigators at over 40 private and public colleges and universities throughtout Ohio on December 1, 1984. This announcement, which is included as Attachment 1 in the Appendix, contained the research priorities identified for the major water problems in the Great Lakes, Upper Mississippi and Ohio River Basins by the Water Resources Research Institutes in the Region. A more detail listing of these priorities is included as Attachment 2 in the Appendix.

The announcement also required interested researchers to request a copy of the Preliminary Proposal Application Form which was to be completed and returned to the Water Resources Center in mid-January, 1985.

The complete distribution list for this mailing, which contains over 250 names, is included as Attachment 3 in the Appendix. In addition to this general mailing, separate letters were sent to the Presidents of the two Historically Black Universities in the State, encouraging them to have their faculty participate in the Program.

Pre-Proposals/Federal Guidelines

Preliminary Proposal Application Forms were requested by and sent to thirty-two investigators and research administrators at fourteen colleges and universities in Ohio. However, no Historically Black University responded. A copy of the Preliminary Proposal Application Form is included as Attachment 4 in the Appendix, and a list of the investigators who requested the Form is included as Attachment 5. A copy of the federal guidelines for the Program were enclosed with the Form. The federal guidelines are included in the Appendix as Attachment 6.

Evaluation/Selection Procedures

Twenty-one pre-proposals from seven universities and colleges throughout the state were submitted for evaluation and consideration. These pre-proposals were subjected to a review by all of the members of the Water Resources Center's Advisory Committee. In addition, the twenty-one pre-proposals were distributed to the various divisions within the three principal state and federal water-related agencies in the

State by the representatives of these agencies who serve on the Advisory Committee, requesting that the divisions review the proposals. The three agencies included in this evaluation were the Ohio Department of Natural Resources; the Ohio Environmental Protection Agency; and the District Office of the United States Geological Survey.

The results of these reviews were presented at a meeting of the Advisory Committee where this panel selected seven of the pre-proposals and instructed the Center's Director to request fully developed proposals from the investigators for the Committee's further consideration.

All seven of the selected pre-proposals were developed more fully and were re-submitted for consideration. The proposals were subjected to a technical review by at least three qualified evaluators selected by individual members of the Water Resources Center's Advisory Committee. Many of these evaluators were from state and federal agencies and from universites other than The Ohio State University.

The results of these reviews were presented at a meeting of the Advisory Committee and this panel ranked all seven of the proposals in the order they felt would best meet the needs and objectives of the Water Resources Center's program. The Advisory Committee then instructed the Center's Director to incorporate the four highest ranked proposals into the FY 1985 Program, and to develop a project for information transfer for the Center.

The membership of the Water Resources Center's Advisory Committee, which includes representatives from five colleges and eleven departments at The Ohio State University and the three representatives of the principal water-related state and federal agencies, is included as Attachment 6 in the Appendix.

Regional Cooperative Inititives

As in the previous years, the four projects selected for this program were compared with the synopses of the projects included in the programs of the other Water Resources Institutes in the Great Lakes, Upper Mississippi and Ohio River Basin Region to ensure that there was no duplication of efforts in the Region's research programs.

In addition, the Ohio State University has recently agreed to become a Charter Member of the Ohio River Basin Research and Education Consortium, and the Director of the Water Resources Center will probably be asked to serve as the University's representative to the Consortium.

Program Management

At least once each quarter, the Director contacts the Principal Investigator on each research and information transfer project to discuss progress made during the quarter and to discuss the next quarter's plan of activities. At this same meeting budget details are reviewed and discussed, and necessary operating and reporting procedures to the Water Resources Center and to the Ohio State University Research Foundation's business office are described.

Progress Reports or Completion Reports will be prepared for each Project by the Principal Investigators and will be used by the Program Director to prepare the Program Final Report.

All of our investigators are urged to publish the results of their findings in the technical literature of their major disciplines and in other journals that are appropriate to the topic of their research. They are also encouraged and invited to present their findings at the Water Luncheon Seminar that is a part of the technology transfer activities of the Center.

The manuscripts that constitute the project completion reports are first reviewed by the Director of the Water Resources Center. As needed, the Director seeks the advice and council of appropriate state, federal and university scientists for methods of enhancing the value of the technical completion reports to the water-related community in the state and in the region.

PLEASE POST OR DISTRIBUTE

ATTACHMENT 1

The Ohio State University

Water Resources Center
1791 Neil Avenue
Columbus, Ohio 43210
Phone 614 422-6108

CALL FOR PRELIMINARY PROPOSALS FOR WATER RESOURCES RESEARCH

The Water Resources Center is soliciting preliminary proposals for the Fiscal Year 1985 State Water Resources Research Program from qualified faculty researchers at Colleges and Universities throughout Ohio. This program is administered in cooperation with the United States Geological Survey of the Department of the Interior.

The type of research supported by this Program includes, but is not limited to -- aspects of the hydrologic cycle; supply and demand for water; demineralization of saline and other impaired waters; water conservation and reuse; depletion and degradation of ground water supplies; improvements in the productivity of water for agricultural and commercial uses; and the economic, legal, engineering, social, recreational, biological, geographical, ecological and other aspects of water problems. However, at least half of the projects included in the Program will be concerned with ground water contamination, the pollution of lakes and streams from non-point sources, the adverse impacts on the water resource from energy production and mining, the potential insufficiency of water for agricultural production and rural communities, and the loss and degradation of water-based habitat for fish and wildlife.

Federal support for new projects in the Program typically is between $10,000 and $20,000 a year and may include indirect costs. However, equal non-federal matching funds must be provided. Two year project proposals will be accepted, but application must be made for the second year and a reportable effort must be accomplished during the first year of the project. The funding cycle for the FY 1985 Program begins between May 1 and October 1, 1985 and ends on June 30, 1986. It is anticipated that between three and five new projects will be funded this year.

For copies of a Preliminary Proposal Application Form, please contact

Dr. Robert C. Stiefel, Director
Water Resources Center
The Ohio State University
1791 Neil Avenue
Columbus, Ohio 43210
614/422-2334

Completed Preliminary Proposal Applications must be received at the Water Resources Center before Friday, January 18, 1985. Successful applicants will be notified around February 1 and will be required to submit a completed project proposal to the Center by February 22. Camera ready proposals will be due at the Center on March 15, 1985.

ATTACHMENT 2

Regional Research Priorities
Great Lakes - Upper Mississippi - Ohio River Region

A. Groundwater contamination

1. Track pollutants through the vadose zone to the groundwater and determine their rate of dissipation in the aquifer.

2. Assess the impacts of the disposal of municipal and industrial wastes and effluents on groundwater systems.

3. Evaluate sources of recharge of the principal aquifers in the region.

4. Determine the effects of the storage of waste heat in aquifers on groundwater quality.

B. Pollution of lakes and streams from non-point sources

1. Assess relative effectiveness of non-point pollution control "best management practices" to meet the demands of P.L. 92-500.

2. Evaluate the effects of atmospheric fallout and precipitation (acids, toxic metals and hazardous trace organics) on public health and the aquatic environment.

3. Estimate the effects of drainage from land use activities in urban areas on surface water quality.

4. Model sediment transport processes and devise techniques for determining sediment delivery ratios.

5. Determine the relative effectiveness of voluntary programs enhanced by various incentives and regulation as mechanisms of implementing non-point pollution control.

6. Predict the impacts that agricultural technologies will have on surface and groundwater resources.

C. Adverse water resources impacts of energy production and mining.

1. Evaluate the impacts that drainage from mining activities will have on the incursion of acids, toxic metals, radio nuclides and hazardous organic compounds into the environment.

2. Assess atmospheric and aquatic pollution from coal-fired electric generation plants.

3. Assess legal, economic, environmental and social impacts and develop means for resolving water user conflicts associated with siting, constructing and operating energy conversion facilities and mining operations.

4. Examine the potential benefits, public and environmental, from the reclamation of heated waters from power generation.

D. Potential insufficiency of waters for agriculture and rural communities

1. Determine optimal water requirements for crop production and develop practical methods for irrigation scheduling.

2. Evaluate criteria for establishing minimum requirements for the drainage of imperfectly drained soils of the region.

3. Develop water conservation practices and methods for holding and temporarily storing surface and drainage waters for reuse in periods of seasonal suboptimal precipitation.

E. Loss and degradation of water based fish and wildlife habitat

1. Define the functional and economic value of wetlands including ecological and hydrological mechanisms that influence their integrity.

2. Develop acceptable mechanisms, including incentives and legislation, for preserving publicly and privately owned wetlands.

3. Determine the quality and quantity of instream flow necessary to maintain an active and viable aquatic biota.

4. Determine the potential and incentives needed to increase wildlife and waterfowl production on private lands.

F. Miscellaneous

Develop the relationship between commercial/commodity and recreational use of the major lake and river systems of the region. Research emphasis should be placed on development of sufficient water-based recreational facilities in urban settings.

ATTACHMENT 3

DISTRIBUTION LIST FOR FY 1985 PROGRAM ANNOUNCEMENT

1. ANTIOCH COLLEGE, YELLOW SPRINGS, OHIO

   Robert Bieri, Department of Biology

2. UNIVERSITY OF AKRON, AKRON, OHIO

   Noel L. Leathers, V. Pres. & Provost
   Robert G. Corbett, Coordinator of Research
   Roger F. Keller, Department of Biology
   John H. Olive, Department of Biology
   George P. Manos, Department of Civil Engineering
   Michael Cheung, Department of Chemical Engineering
   James K. Hardy, Department of Chemistry
   David H. O'Keeffe, Department of Chemistry

3. ASHLAND COLLEGE, ASHLAND, OHIO

   John D. Baker, V. Pres. for Acad. Affairs
   Randall Rhoades, Department of Biology

4. BALDWIN-WALLACE COLLEGE, BEREA, OHIO

   Neal Malicky, V. Pres. for Acad. Affairs
   T. C. Surrarrer, Department of Biology
   Glenn W. Peterson, Chairman, Department of Biology

5. BOWLING GREEN STATE UNIVERSITY, BOWLING GREEN, OHIO

   Kenneth W. Rothe, Provost
   Bayliss L. Prater, Department of Biology
   R. D. Hoare, Department of Geology
   Lester J. Walters, Department of Geology
   William B. Jackson, Director, Environmental Studies Center
   M. P. Henning, III, Firelands Campus
   Vakula S. Srivivasan, Department of Chemistry

6. CAPITAL UNIVERSITY, COLUMBUS, OHIO

   Walter B. Wiser, Provost
   Paul M. Zimpfer, Department of Biology

7. CASE WESTERN RESERVE UNIVERSITY, CLEVELAND, OHIO

James G. Taaffe, V. Pres., Undergrad. & Grad. Studies
James T. Koppenhaver, Research Administration
Erwin Dieckman, Research Administration
Joseph F. Koonce, Department of Biology
N. A. Alldridge, Department of Biology
Yacov Y. Haimes, Department of Systems Engineering
Richard Prober, Department of Chemical Engineering
Frank B. Cliffe, Jr., Department of Political Science
Benjamin F. Hobbs, Department of Systems Engineering
Gerald Matisoff, Department of Geological Sciences
Peter McCall, Department of Geological Sciences

8. CENTRAL STATE UNIVERSITY, WILBERFORCE, OHIO

Lionel H. Newsom, President
Bernard H. Johnson, Chair, University Research Comm.
Arthur Thomas, V. Pres., Academic Affairs

9. WILBERFORCE UNIVERSITY

Yvonne Walker-Taylor, President

10. UNIVERSITY OF CINCINNATI, CINCINNATI, OHIO

Carl Osterbrock, Vice Provost for Acad. Affairs
G. Rieveschl, Jr., Vice Pres. for Research
Jack Gottschang, Department of Biological Sciences
J. Robie Vestal, Department of Biological Sciences
Bruce L. Umminger, Department of Biological Sciences
Michael Miller, Department of Biological Sciences
Louis M. Laushey, Department of Civil Engineering
J. David Eye, Environmental Health Engineering
Thomas C. Kane, Department of Biological Sciences

11. CLEVELAND STATE UNIVERSITY, CLEVELAND, OHIO

Robert F. Boord, Director of Research Services
F. M. Galloway, Department of Chemical Engineering
V. K. Mathur, Department of Economics
Paul Olynyk, Division of Environmental Science

12. UNIVERSITY OF DAYTON, DAYTON, OHIO

Joseph Stander, V. Pres. for Academic Affairs
Joseph Militello, Research Institute
Albert J. Burky, Department of Biology
J. D. Laufersweiler, Department of Biology
Charles J. Ritter, Geology Department
John Rowe, Department of Microbiology
Roy M. Ventullo, Department of Microbiology
University of Dayton, Research Institute

13. DEFIANCE COLLEGE

Richard Whon, Director of Development
Dean of College
G. C. DeRoth, Department of Biology

14. DENNISON UNIVERSITY

Louis F. Brakeman, Provost
Allen L. Robuck, Department of Biology
Thomas Evans, Department of Chemistry

15. FINDLAY COLLEGE

Louis F. Chenette, Assistant to the President
W. J. McBride, V. Pres., Academic Affairs

16. HEIDELBERG COLLEGE

Arthur R. Porter, Jr., V.P. for Academic Affairs
Howard H. Hintz, Department of Biology
David Baker, Department of Biology

17. HIRAM COLLEGE

Robert MacDowell, V.Pres. & Dean of College

18. JOHN CARROLL UNIVERSITY

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Edwin J. Skoch, Chairman of Aquatic Ecology
Department of Biology

19. KENT STATE UNIVERSITY

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Waldo Semon, Department of Chemistry
B. Miller, Department of Geology
Eugene Wenninger, Center for Urban Regionalism
and Environmental Systems
Yoram Eckstein, Department of Geology

20. KENYON COLLEGE

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Robert C. Burns, Department of Biology

21. KETTERING COLLEGE OF MEDICAL ARTS

Winton H. Beaven, Dean and V. Pres., Education

22. MALONE COLLEGE

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23. MARIETTA COLLEGE

William H. Thompson, V. Pres., Dev.
John W. Perry, Biology Department
David F. Young, Department of Biology
Paul J. Seyler, Department of Biology

24. MARY MANCE COLLEGE

Sister Kathleen Murphy

25. MEDICAL COLLEGE OF OHIO AT TOLEDO

J. C. Burnham, Department of Microbiology

26. MIAMI UNIVERSITY

David G. Brown, Exec. V. Pres. for Acad. Affairs
Lloyd Goggin, Vice President, Finance & Business Affairs
Charles Vaughn, Acting Director of Research
Christopher Barthel, Jr., Special Asst. for Research Institute for Environmental Science
Gary W. Barrett, Department of Zoology
Thomas E. Wissing, Department of Zoology
Robert Winner, Department of Zoology
Marion W. Boesel, Department of Zoology
Institute of Environmental Science
Office of the Dean, The Graduate School and Research

27. MUSKINGUM COLLEGE

Daniel E. Van Tassel, V. Pres., Acad. Affairs
William Adams, Department of Biology
Ray Rataiczak, Coordinator, Science Division
Jack Kovack, Chairman, Department of Geology

28. OBERLIN COLLEGE

James L. Powell, V. Pres. & Provost
David A. Egloff, Department of Biology

29. OHIO NORTHERN UNIVERSITY

I. Leonard Stright, Acad. Vice President
Charles C. Laing, Department of Biology

30. OHIO UNIVERSITY

W. A. Wistendahl, Department of Botany
Neil Buckley, Provost
John R. R. Collier, Associate Dean
Norman S. Cohn, Director of Research
Adam Marsh, Manager, Research Institute
Moid Uddin Ahmad, Department of Geology
S. Maier, Department of Zoology & Microbiology
Tiao J. Chang, Department of Civil Engineering
William D. Hummon, Department of Zoology
Donald E. Scheck, Department of Industrial & Civil Engineering

31. OHIO WESLEYAN UNIVERSITY

Lauren R. Wilson, Acting Provost
William F. Hahnert, Department of Zoology

32. OTTERBEIN COLLEGE

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Jeanne Willis, Department of Biology

33. RIO GRANDE COLLEGE

Clyde Evans, Provost

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Lloyd Charlesworth, Department of Geology
John Gillespie, Director, Urban Studies Center

35. URBANA COLLEGE

Joseph LaLumia, Dean of the College
C. MacFrederick, Head, Mathmatics & Science Dept.

36. WILMINGTON COLLEGE

Arthur L. Buell, Academic Dean
Thomas K. Wood, Department of Biology

37. WITTENBERG UNIVERSITY

William M. Wiebenga, Provost
Nathan J. Bolls, Department of Biology
Louis J. Laux, Department of Biology
Albert Frasca, Professor of Physics

38. COLLEGE OF WOOSTER

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39. WRIGHT STATE UNIVERSITY

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Ronald G. Schmidt, Department of Geology
B. H. Richard, Department of Geology
Paul Pufkhar, Department of Geology
Adel Bakr, Department of Geology

40. XAVIER UNIVERSITY

Rev. Francis C. Brennan, S.J., V. P., Acad. Affairs
Daniel J. Higgins, Department of Biology
Father C. Thepe, Chemistry Department

41. YOUNGSTOWN STATE UNIVERSITY

N. Paraska, Dean, Technical and Community College
George W. Kelley, Jr., Department of Biology
L. A. Schroeder, Department of Biology
Irfan Khan, Department of Civil Engineering
Ikram U. Khawaja, Department of Geology

42. OHIO STATE UNIVERSITY

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College of Agriculture and Home Economics
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Agricultural Economics
Norman Rask

Agricultural Education
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David L. Johnson

OARDC (Ohio Agricultural Research and Development Center)
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Agricultural Engineering
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D. M. Van Doren, Jr.

Department of Entomology
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Plant Pathology
T. Craig Weidensaul

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John P. Vimmerstedt

College of the Arts and Sciences

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F. Joseph Margraf - Ohio Cooperative Fisheries Unit
Theodore A. Bookout - Ohio Cooperative Wildlife Unit

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Ted M. Cavender
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College of Mathematical and Physical Sciences
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Department of Physics
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College of Social and Behavioral Sciences

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Department of Geography
Edward J. Taaffe
John N. Rayner

Department of Sociology
Enrico L. Quarantelli
Saad Z. Nagi

College of Engineering
Donald L. Glower, Dean

Department of Aeronautical and Astronautical Engineering
Stuart L. Petrie
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Rudolf Edse
Odus R. Burggraf

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Department of Chemical Engineering
Jacques L. Zakin, Chairman
Edwin E. Smith
Christie J. Geankoplis
Robert S. Brodkey
Liang-Shih Fan
Edwin R. Haering
Harry C. Hersey
Kent S. Knaebel
Duane R. Skidmore

Department of City and Regional Planning
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Steven I. Gordon
Kenneth T. Pearlman

Department of Civil Engineering
Robert L. Sierakowski, Chairman
Keith Bedford
Elbert E. Whitlatch
Robert M. Sykes
Alan J. Rubin
Vincent T. Ricca
Charles A. Moore
Scot E. Smith
Tien H. Wu

Department of Electrical Engineering
Hsien C. Ko

Department of Industrial and Systems Engineering
Albert B. Bishop
Thomas H. Rockwell
Gordon Clark

Department of Mechanical Engineering
Charles D. Jones, Chairman
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Lit S. Han
Walter E. Carey

Department of Metallurgical Engineering
George R. St. Pierre, Chairman
Brian Wilde, Director, Fontana Corrosion Center

School of Architecture
John R. Voss, Director, Architecture Adm.

Landscape Architecture
Jot C. Carpenter

College of Medicine
David S. Yohn - Cancer Research Center

Department of Preventive Medicine
John R. Wilkins

Research Foundation
Thomas J. Sweeney, Assoc. V. P., Research
McIver Woody

FY 1985 STATE WATER RESOURCES RESEARCH PROGRAM
WATER RESOURCES CENTER, THE OHIO STATE UNIVERSITY
Preliminary Proposal Application Form

Mail 20 copies of Application and 1 copy of Principal Investigator's curriculum vitae to:

Robert C. Stiefel, Director
Water Resources Center
The Ohio State University
1791 Neil Avenue
Columbus, Ohio 43210
(614) 422-2334

Application due at Water Resources Center on Friday, January 18, 1985.

PROPOSED PROJECT PERIOD:* From: To:

Number of Grad. Students for Project:

FEDERAL FUNDS:
Total Requested** | Amount Thru 6/30/1986

MATCHING FUNDS:
Total Committed** | Amount Thru 6/30/1986

PROJECT TITLE:

PRINCIPAL INVESTIGATOR'S NAME(S):

PRINCIPAL INVESTIGATOR'S TITLE(S) AND MAILING ADDRESS:

TELEPHONE NUMBER:

EVALUATOR'S COMMENTS:

A. Statement of the critical regional or State water problem(s) to be addressed by the Project, including an explanation of the need for this research (Who wants it? Why?).

*The annual project cycle begins between May 1 and October 1, and ends on June 30. Two-year project proposals are acceptable, but re-application must be made for the second year and are contingent upon Federal Funds being appropriated.

**Include both direct and indirect costs. Non-federal matching funds must at least equal the federal funds requested.

B. Nature, scope and objectives of research.

C. Methods, procedures and facilities to be used.

D. Statement of results, benefits and/or information anticipated from the project, and how they are to be used.

E. If more than a 12 month project, descibe the work to be accomplished before June 30, 1986

ATTACHMENT 5

DISTRIBUTION LIST FOR FY 1985
PRELIMINARY PROPOSAL FORM

1. Liang-Shih Fan
Chemical Engineering
Ohio State University
421B Koffolt Laboratory
140 West 19th Avenue
Columbus, Ohio 43210

2. Roy M. Ventullo
Department of Microbiology
University of Dayton
Dayton, Ohio 45469

3. Albert J. Burky
Department of Biology
University of Dayton
Dayton, Ohio 45469

4. John Rowe
Department of Microbiology
University of Dayton
Dayton, Ohio 45469

5. Moid Uddin Ahmad
Department of Geology
Ohio University
Athens, Ohio 45701

6. Robert L. Vertrees
Natural Resources
Ohio State University
469B Kottman Hall
2021 Coffey Road
Columbus, Ohio 43210

7. Roy A. Stein
Zoology
Ohio State University
207A Botany & Zoology Bldg.
1735 Neil Avenue
Columbus, Ohio 43210

8. Tiao J. Chang
Department of Civil Engineering
Ohio University
Athens, Ohio 45701

9. Kenneth A. Krieger
Water Quality Laboratory
Heidelberg College
Tiffin, Ohio 44883

10. John G. Lyon
Civil Engineering
Ohio State University
414C Civil & Aero Engr. Bldg.
2070 Neil Avenue
Columbus, Ohio 43210

11. Earl E. Whitlatch
Ohio State University
Civil Engineering
417F Hitchcock Hall
2070 Neil Anenue
Columbus, Ohio 43210

12. Jeffrey C. Burnham
Department of Microbiology
Medical College of Ohio
Toledo, Ohio 43699

13. Susan W. Fisher
Ohio State University
Entomology
103B Botany and Zoology Bldg.
1735 Neil Avenue
Columbus, Ohio 43210

14. Alan Springer
Dept. Paper Science & Engr.
Miami University
Oxford, Ohio 45056

15. Charles F. Cole
Chairman, Natural Resources
Ohio State University
365B Kottman Hall
2021 Coffey Road
Columbus, Ohio 43210

16. S. James Ryckman
Department of Civil Engineering
University of Dayton
300 College Park
Dayton, Ohio 45469

17. Yoram Eckstein
Department of Geology
Kent State University
Kent, Ohio 44242

18. Olli Tuovinen
Microbiology
Ohio State University
622 Bioscience Bldg.
484 W. 12th Ave.
Columbus, Ohio 43210

19. William Strohl
Microbiology
Ohio State University
Bioscience Bldg.
484 W. 12th Ave.
Columbus, Ohio 43210

20. Garry D. McKenzie
Geology and Mineralogy
Ohio State University
319 Mendenhall
125 South Oval Mall
Columbus, Ohio 43210

21. T.C. Surrarrer
Professor Emeritus
Biology Department
Baldwin-Wallace College
Berea, Ohio 44017

22. Benjamin F. Hobbs
Systems Engineering
Case Western Reserve University
Cleveland, Ohio 44106

23. H. Michael Cheung
Chemical Engineering
University of Akron
Akron, Ohio 44325

24. Kaye R. Everett
Agronomy
Ohio State University
422C Kottman Hall
2021 Coffey Road
Columbus, Ohio 43210

25. Robert Sykes
Civil Engineering
Ohio State University
417D Hitchcock Hall
2070 Neil Avenue
Columbus, Ohio 43210

26. Ted Barnard
Department of Geography
Ohio University
Athens, Ohio 45701

27. Elliot Tramer
Department of Biology
University of Toledo
Toledo, Ohio 43606

28. Jay Tashiro
Department of Biology
Keynon College
Gambier, Ohio 43022

29. Irfan Kahn
Department of Civil Engineering
Youngstown State University
Youngstown, Ohio 44555

30. Ed Emmons
Department of Biological Sciences
Bowling Green State University
Bowling Green, Ohio 43403

31. Robert Pfister
Chairman, Microbiology
Ohio State Unversity
372 Bioscience Bldg.
484 W. 12th Ave.
Columbus, Ohio 43210

32. Dr. Harvey
Department of Geology
Kent State University
Kent, Ohio 44242

ATTACHMENT 6

FEDERAL GUIDELINES

FOR THE PREPARATION OF RESEARCH PROJECT PROPOSALS TO THE OHIO WATER RESOURCES RESEARCH PROGRAM FOR FY 1985

(A Review of the Federal Guidelines)

A. Purpose. The purpose of this memorandum is to establish procedures for the preparation of proposals to the Ohio Water Resources Center (WRC). The source of funds will be the U.S. Geological Survey (USGS) in the U.S. Department of the Interior.

B. Research Project Proposals. A full narrative proposal and a synopsis prepared by the principal investigator(s) for each proposed project is required. The synopsis must incorporate information to show the relevance of the proposed study to water resources issues or management problems common among States in the region and the contribution the project or activity is expected to make toward their solution.

The synopsis will be entered in the USGS Management Information System and used for program characterization on regional and nationwide scales. The full proposal is to be used principally at the Center for evaluation of the project's technical merit and relevance. Copies of the synopsis and the proposal will be included in the Center's proposal to USGS, however.

C. The synopsis, not to exceed two pages, is to consist of:

1. Number (2 digits) - to be assigned by WRC.

2. Title (100 characters or less - adequate to describe theme of research).

3. COWWR Category (one; best fit - from WRSIC's abstracting guide).*

4. Keywords (from Water Resources Thesaurus, 3rd edition, OWRT IT 80/1, 1980).*

* If not available, please visit or call the WRC for details.

5. Duration (mo/yr start to mo/yr finish). Note: Projects may start on or after June 1, 1985 and must end before June 30, 1986. No-cost extensions will not be allowed. Longer duration projects will be considered, provided they contain a reportable element to be included in the FY 1985 program report that must be submitted to the USGS in June, 1985. However, no guarantee of additional federal funds for the following year can be made.

6. Fiscal Year 1985 Federal funds. The WRC will limit Federal funds for each project to $25,000.

7. Non-Federal funds allocated to the project. Non-Federal funds of at least 100% of the Federal funds must be committed to the project.

8. Name(s) and university of principal investigator(s).

9. Congressional District of university performing research.

10. Statement of the critical regional or State water problem(s) to be addressed by the project, including an explanation of the need for the research (Who wants it? Why?) (Two paragraphs maximum).

11. Statement of results, benefits and/or information expected to be gained by use of the grant during the performance period and by the end of the project, if of longer duration, and how they will be used. (Two paragraphs maximum.

D. The full proposal is to consist of the synopsis plus the following sections, which are to start on a new page.

12. Nature, Scope and Objectives of the Research - Indicate results expected to be achieved by use of grant in performance period and by end of project if of longer duration. Incorporate objectives from FY 1984 grant if project is continuing.

13. Related Research - Show by literature and communication citations the similarities and dissimilarities of this proposed project to completed or ongoing research on the same topic.

14. Methods, Procedures and Facilities - Provide sufficient information to permit evaluation of the technical adequacy of approach to satisfy

objectives.

15. Progress Review - Review tasks funded in prior years if this project is a continuation, and progress at time this proposal is prepared.

16. Expenditures - Explain the need for any non-expendable property of more than $1000/unit, the kinds of project-related travel and the categories of supplies and miscellaneous expenses for which Federal funds are requested.

17. Investigator(s) Qualifications - Include resume' of principal investigator(s). No resume' is to exceed three pages or list more than 15 pertinent publications.

18. Training Potential - Estimate the number of graduate students, fields of specialty and degrees expected to result from participation in the project. Also estimate the number of undergraduate students expected to participate in the project.

ATTACHMENT 7

WATER RESOURCES CENTER ADVISORY COMMITTEE

COLLEGE OF ENGINEERING

1. Dr. Vincent T. Ricca
   Civil Engineering

2. Professor Edwin E. Smith
   Chemical Engineering

3. Dr. Robert C. Stiefel
   Director
   Water Resources Center

4. Dr. Brian Wilde
   Metallurgical Engineering

School of Architecture

5. Dr. Steven I. Gordon
   City and Regional Planning

COLLEGE OF BIOLOGICAL SCIENCES

6. Dr. Robert M. Pfister
   Microbiology

7. Dr. Jeffrey Reutter
   Lake Erie Programs

8. Dr. William DeMott
   Zoology

9. Dr. F. Joseph Margraf
   Acting Leader
   Ohio Cooperative
   Fisheries Unit

COLLEGE OF MATHEMATICS AND PHYSICAL SCIENCES

10. Dr. Garry McKenzie
    Geology and Mineralogy

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

11. Dr. Terry J. Logan
    Agronomy

12. Dr. Glenn O. Schwab
    Agricultural Engineering

School of Natural Resources

13. Dr. Robert L. Vertrees
    Resources Management

COLLEGE OF MEDICINE

14. Dr. John R. Wilkens, III
    Preventive Medicine

ADMINISTRATIVE MEMBER

15. Mr. McIver C. Woody
    Ohio State University
    Research Foundation

OHIO ENVIRONMENTAL PROTECTION AGENCY

16. Dr. John F. Estenik

OHIO DEPARTMENT OF NATURAL RESOURCES

17. Dr. William Mattox

UNITED STATES GEOLOGICAL SURVEY

18. Mr. Steven Hindall
    District Chief

CHAPTER 4

INFORMATION TRANSFER

The Water Resources Center does not have an information transfer specialist on its staff, and there are no plans to add one in the immediate future. Therefore, the Center's major activities in information dissemination are accomplished on a project-by-project basis and are often dependent on the initiatives and with the support of project personnel.

The process sometimes starts during the review and selection of proposals for the State Water Resources Research Program. An external reviewer from a State Agency often expresses an interest in a proposed line of research; and, where it is appropriate and proper, the Center will provide a linkage between the reviewer and the proposed investigator. If the proposal is selected for support, the Center encourages the researcher to maintain the contact and seek the input of the potential user into the conduct of the research, either as a source of data or as a cooperator on the project. This type of relationship currently exists on a project being conducted for the Center by Drs. Hobbs and Haimes of Case Western Reserve University with personnel in the Division of Oil and Gas at the Ohio Department of Natural Resources.

Another type of linkage exists when a researcher has access to a decision making body as a member of a technical advisory committee and can directly report research results to the body through the committee's activities. This was recently the case in a project where the bio-availability of phosphorus in Lake Erie was needed to correctly establish some effluent discharge limits.

It is important to recognize that the work supported by the Center is sometimes only a component of a larger research effort on which the Principal Investigator has been working for several years. Not only would it be inappropriate but it would also be ineffective for the Center to provide a program for information transfer related to this effort. Both Dr. Fan's work on bio-reactors and Drs. Krieger's and Baker's work on the impacts of non-point pollution have been active and productive research areas for several years and have received several large research grants with technology transfer components included in them. The support provided by the Center to these projects has been properly acknowledged.

The Water Resources Center continues to co-sponsor a bi-monthly Water Luncheon Seminar Program for the water resources community in Central Ohio. This program, which was developed cooperatively with the Ohio Department of Natural Resources, the Ohio Environmental Protection Agency, the Soil Conservation Service, the District Office of the U.S. Geological Survey and the Agricultural Engineering Extension Service

continues to attract between 40 and 70 water resources professionals from federal, state, county, municipal agencies; the private sector; and from the university to a forum to discuss water policy issues, problems, programs and research.

The Water Resources Center, in cooperation with the Center for Lake Erie Area Research (CLEAR) and the Ohio Sea Grant Program, maintains a water resources library that is open to all citizens of the State. The Center's plan to develop an interactive, computer system to help in the search capabilities for our materials.

The Center has just completed the development of a directory of water related agencies within Ohio, and will be seeking the support of the principal groups in the State to help defray the costs of publishing and distributing the directory during FY 1985. The Center is also preparing a directory of the water-resources expertice that is available in the Universities and Colleges throughout the State.

The Center Director continues to meet with the leading water resources officials in the state for the purposes of consultation and collaboration to identify the major water problems and the research needs of the state and region; to share information on current water management policy issues; to seek continued support for our water research program; and to disseminate the information developed through the Center's research program.

CHAPTER 5

TRAINING

When the Water Resources Center was designated as the State Water Resources Research Institute in Ohio in 1964, the Center's Advisory Committee adopted an operating policy that required the inclusion of student training as a pre-requisite to the selection of a project for the Annual State Water Resources Research Program. In addition, the training of future water scientists and engineers has always been an important part of the federal requirements for this program.

Each of the forty-two projects that have been supported by the Water Resources Center during the past ten fiscal years have included at least one student in a meaningful role. On thirty-nine of these projects, either a Masters thesis or a Doctoral disseration has been or is being prepared. Of the three remaining projects, one was conducted in a department that has only a non-thesis option for its graduate programs; another was conducted at a college that does not have a graduate school; and the student resigned from the third project after the work was completed - but before the student completed his thesis.

Student training was provided on all forty-two projects however, and these students prepared a total of thirty-eight Masters theses and twenty-four Doctoral dissertations. Table 1 shows the number of Masters theses and Doctoral dissertations produced by discipline for the State Water Resources Research Program for the period between FY1975 - FY1984; and Figure 2 shows the distribution of these graduate publications by area of training.

Student training was also provided on the fifteen Matching Fund projects that were sponsored by the U. S. Department of the Interior at Universities in Ohio during the last ten fiscal years. An additional fourteen Masters theses and eleven Doctoral dissertations resulted from the student training provided on these fifteen projects. Table 2 shows the number of Masters and Ph.D. theses and dissertations produced by discipline for students supported by the Matching Fund Program for the period between FY1975 and FY1984; and Figure 3 shows the numbers of publications by the area of training that was provided.

The Annual State Water Resources Research Program has provided training support to 120 students during the past ten years including twenty at the Bachelors level, seventy at the Masters level, twenty-six at the Doctoral level and four at the Post-Doctoral level. Collectively the students represented twenty-three academic disciplines from eleven universities and colleges within the State. Table 3 shows the number of students trained in the Stste Water Resources Research Program by the level of training provided and by the disciplines for these students;

Figure 4 shows the number of students trained by the level of training provided; and Figure 5 shows the breakdown on the numbers of students trained by the level of training provided as a function of the area of training.

The Matching Fund Program provided support for an additional sixty-five students from twelve academic disciplines including twelve undergraduate students, twenty-eight Masters and twenty-one Doctoral candidates. Table 4 shows the number of students trained by level and by discipline for this program; Figure 6 shows the number of students by level of training provided; while Figure 7 shows the distribution of the numbers of students in each degree category as a function of the area of training provided.

An informal survey was conducted to attempt to determine the present employment of the graduate students who were supported by the Water Resources Center's programs. Of the seventy-three students for which the Principal Investigators provided information, thirty- two percent (23) work for either local, state or federal governments; twenty-seven percent (20) are in the private sector; and forty-one percent (30) are equally divided as faculty members or Ph. D. and Post-Ph. D. students associated with universities. Nearly all of these former students are still working in capacities that are related to water resources. The results of this survey are shown in Table 5.

TABLE 1. NUMBER OF THESES AND DISSERTATIONS BY AREA/DISCIPLINE
FY1975 - FY1984 STATE WATER RESOURCES RESEARCH PROGRAM

AREA/DISCIPLINE	NUMBER		
	Masters Theses	Doctoral Dissertations	Total
NATURAL SCIENCE			
Agronomy	0	1	1
Aquatic Ecology	0	1	1
Biological Science	0	0	0
Botany	0	2	2
Environmental Science	1	0	1
Food Science	0	1	1
Microbiology	4	3	7
Natural Resources	3	0	3
Soil Science	0	1	1
Zoology	7	3	10
Sub-Total	15	12	27
ENGINEERING			
Chemical	7	3	10
Civil	9	4	13
Electrical	0	1	1
Environmental	0	1	1
Industrial	0	0	0
Sub-Total	16	9	25
PHYSICAL SCIENCE			
Chemistry/Physics	2	0	2
Environmental Chemistry	1	0	1
Geology/Earth Science	3	2	5
Mathematics	1	0	1
Sub-Total	7	2	9
SOCIAL/INSTITUTIONAL SCIENCE			
Journalism	0	0	0
Political Science	0	0	0
Resource Policy	0	1	1
Computer Science	0	0	0
Sub-Total	0	1	1
TOTALS FOR PROGRAM	38	24	62

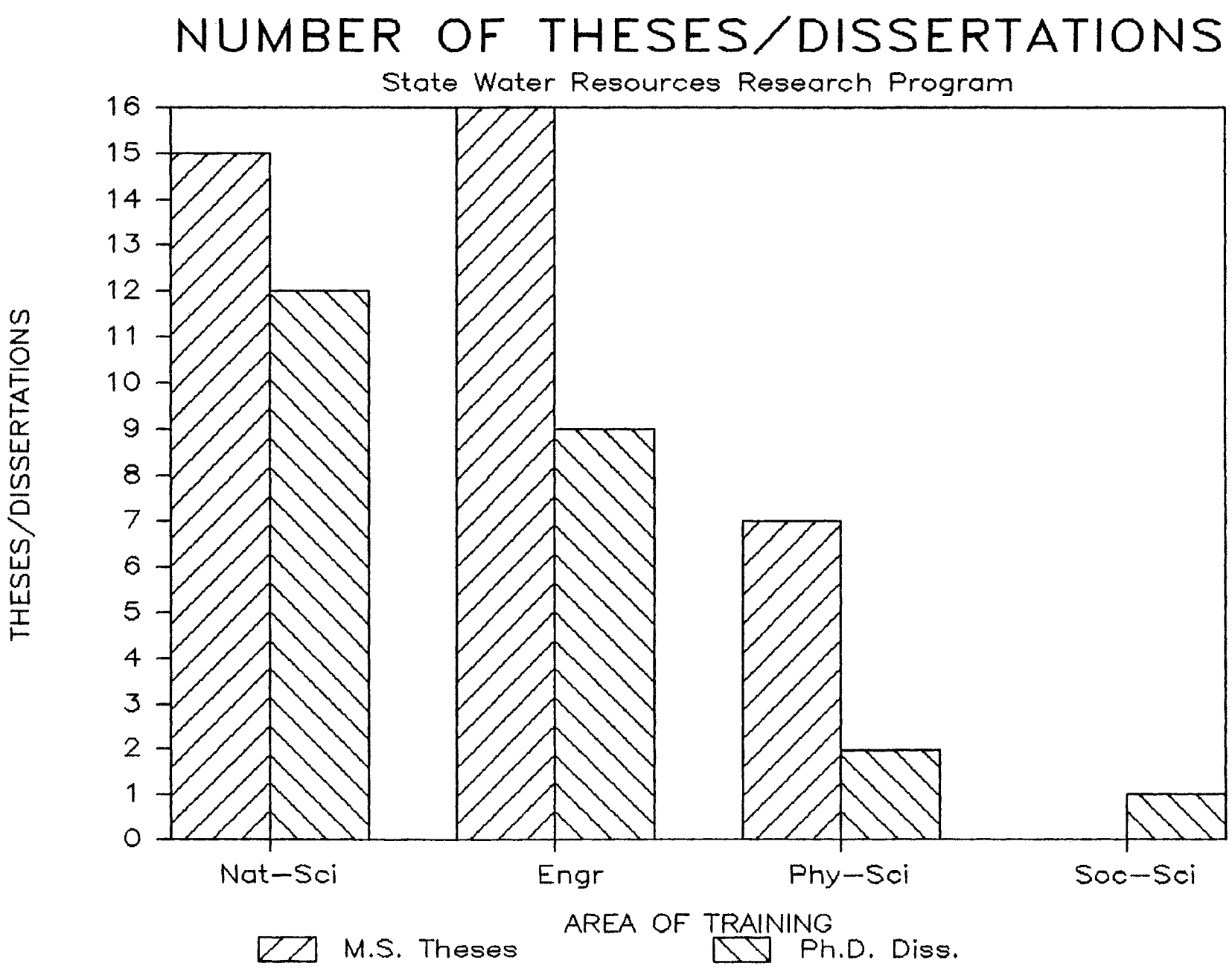

NUMBER OF THESES/DISSERTATIONS
State Water Resources Research Program
THESES/DISSERTATIONS
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Nat—Sci
Engr
Phy—Sci
Soc—Sci
AREA OF TRAINING
M.S. Theses
Ph.D. Diss.

TABLE 2. NUMBER OF THESES AND DISSERTATIONS BY AREA/DISCIPLINE
FY1975 - FY1984 MATCHING FUND PROGRAM

AREA/DISCIPLINE	NUMBER		
	Masters Theses	Doctoral Dissertations	Total
NATURAL SCIENCE			
Aquatic Ecology	0	0	0
Biological Science	2	0	2
Microbiology	3	3	6
Soil Science	0	0	0
Sub-Total	5	3	8
ENGINEERING			
Civil	7	4	11
Electrical	1	0	1
Mechanical	0	0	0
Systems	0	4	4
Sub-Total	8	8	16
PHYSICAL SCIENCE			
Chemistry/Physics	0	0	0
Environmental Chemistry	1	0	1
Geology/Earth Science	0	0	0
Mathematics	0	0	0
Sub-Total	1	0	1
SOCIAL/INSTITUTIONAL SCIENCE			
Journalism	0	0	0
Political Science	0	0	0
Resource Policy	0	0	0
Computer Science	0	0	0
Sub-Total	0	0	0
TOTALS FOR PROGRAM	14	11	25

NUMBER OF THESES/DISSERTATIONS

Matching Fund Program

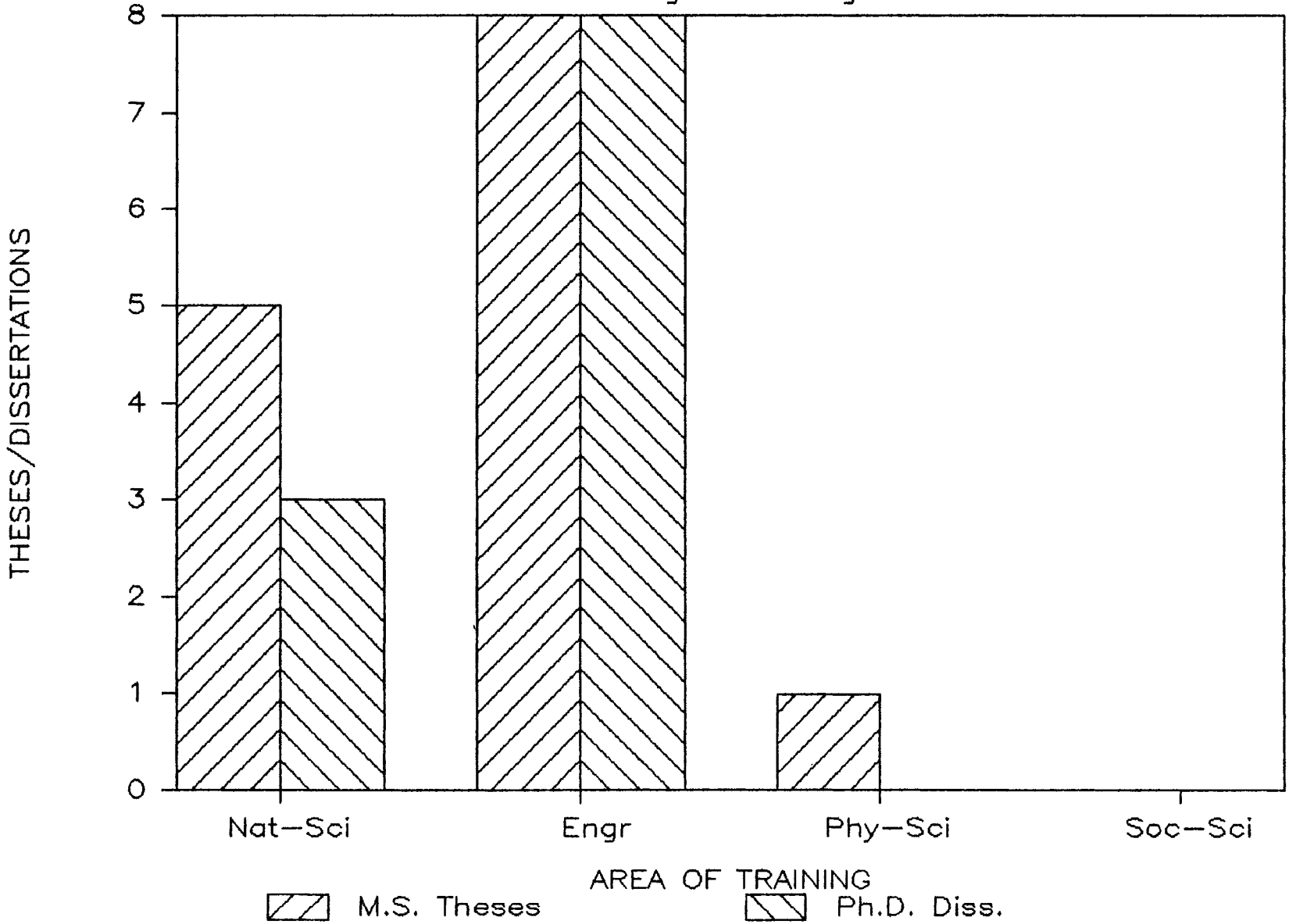
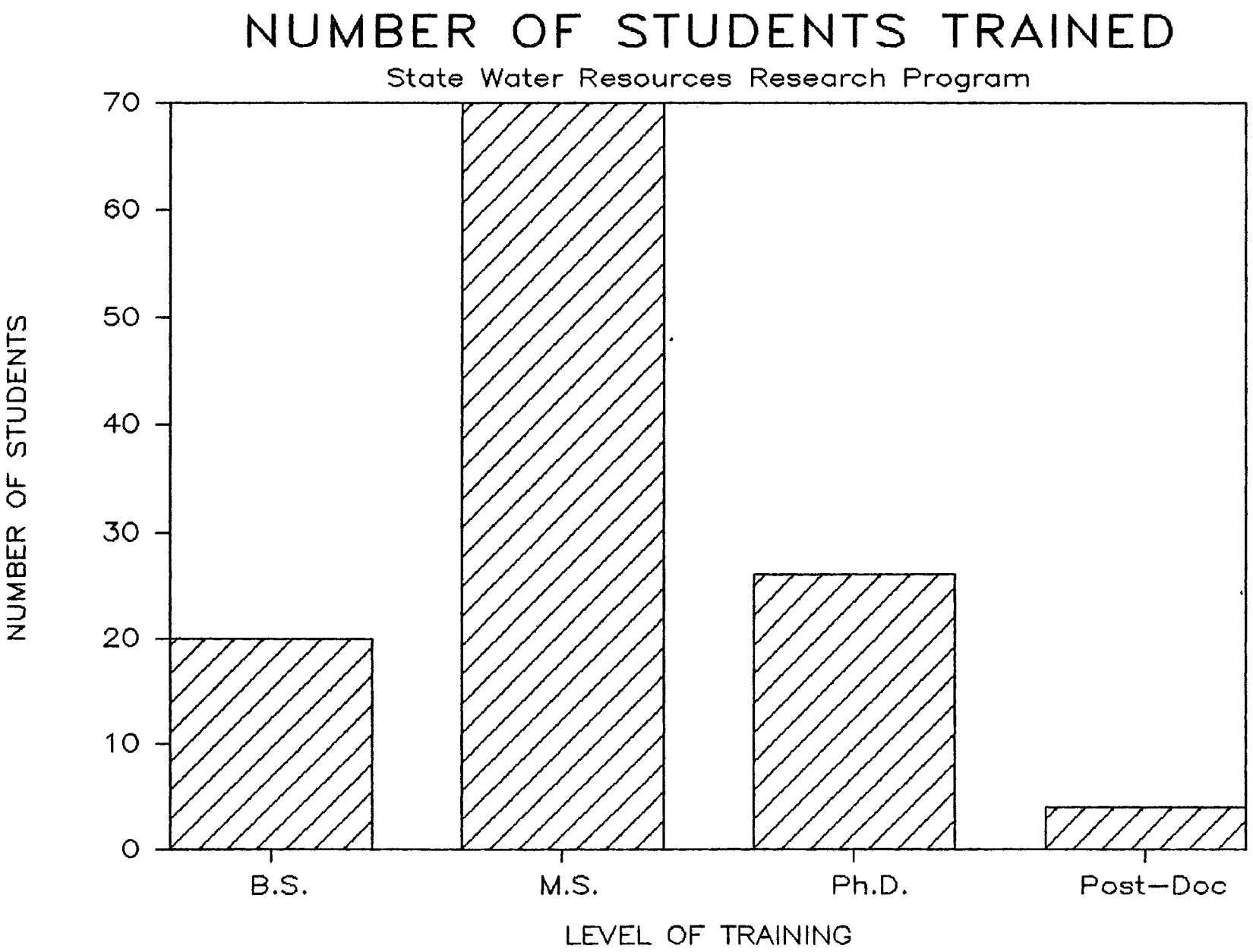


TABLE 3. NUMBER OF STUDENTS TRAINED BY AREA/DISCIPLINE AND LEVEL
FY1975 - FY1984 STATE WATER RESOURCES RESEARCH PROGRAM

AREA/DISCIPLINE	LEVEL OF TRAINING				
	Under-Graduate	Masters Degree	Ph.D. Degree	Post-Ph.D.	Total
NATURAL SCIENCE					
Agronomy	0	0	1	0	1
Aquatic Ecology	0	0	1	0	1
Biological Science	1	0	0	0	1
Botany	0	2	1	0	3
Environmental Science	1	3	0	0	4
Food Science	0	0	1	0	1
Microbiology	2	5	5	0	12
Natural Resources	3	3	0	0	6
Soil Science	0	0	1	0	1
Zoology	6	16	3	0	25
Sub-Total	13	29	13	0	55
ENGINEERING					
Chemical	1	9	3	3	16
Civil	1	14	5	1	21
Electrical	0	0	1	0	1
Environmental	0	0	1	0	1
Industrial	1	0	0	0	1
Sub-Total	3	23	10	4	40
PHYSICAL SCIENCE					
Chemistry/Physics	0	4	0	0	4
Environmental Chemistry	0	1	0	0	1
Geology/Earth Science	2	8	2	0	12
Mathematics	0	2	0	0	2
Sub-Total	2	15	2	0	19
SOCIAL/INSTITUTIONAL SCIENCE					
Journalism	0	2	0	0	2
Political Science	0	1	0	0	1
Resource Policy	0	0	1	0	1
Computer Science	2	0	0	0	2
Sub-Total	2	3	1	0	6
TOTALS FOR PROGRAM	20	70	26	4	120


NUMBER OF STUDENTS TRAINED
State Water Resources Research Program
NUMBER OF STUDENTS
70
60
50
40
30
20
10
0
B.S.
M.S.
Ph.D.
Post—Doc
LEVEL OF TRAINING

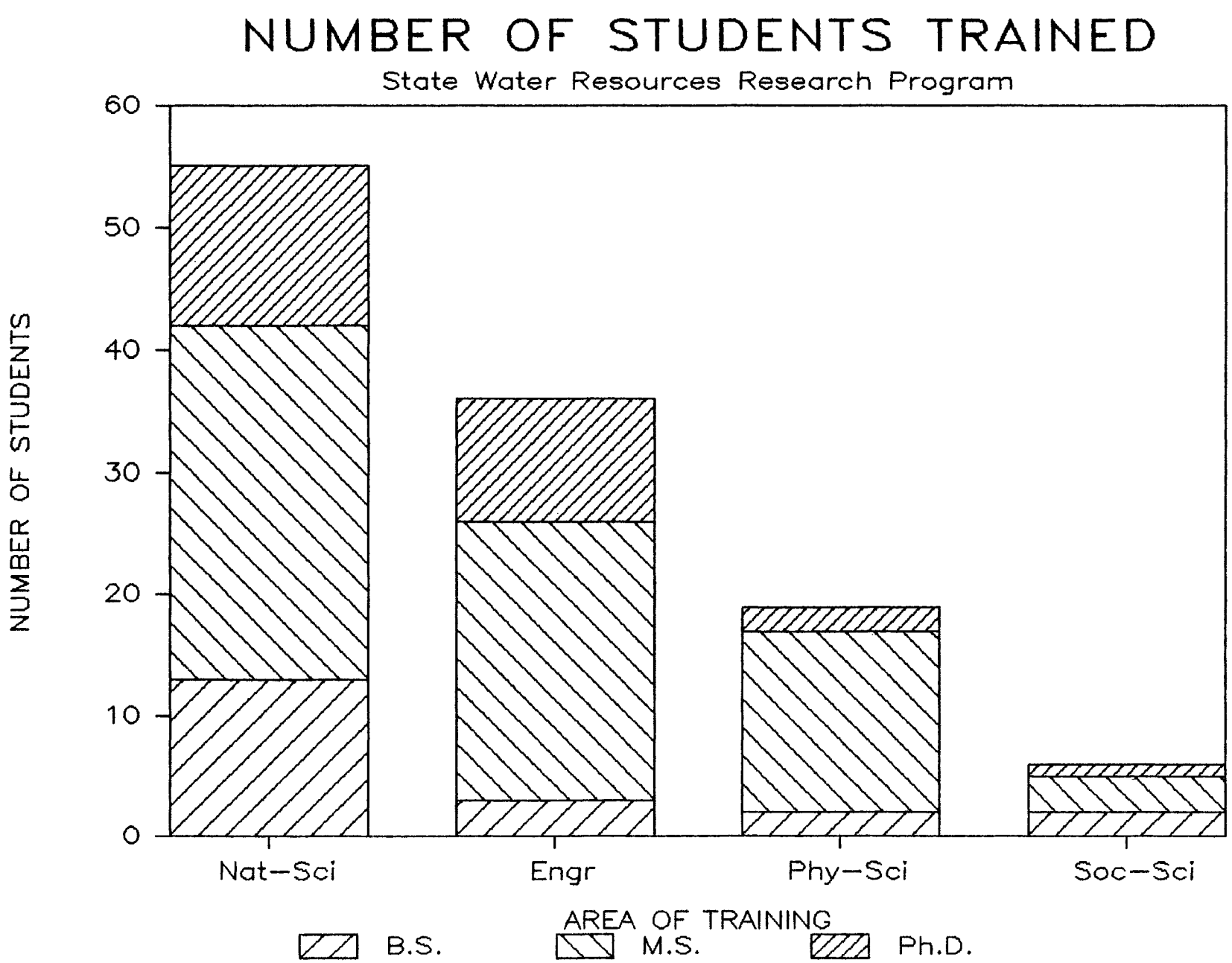
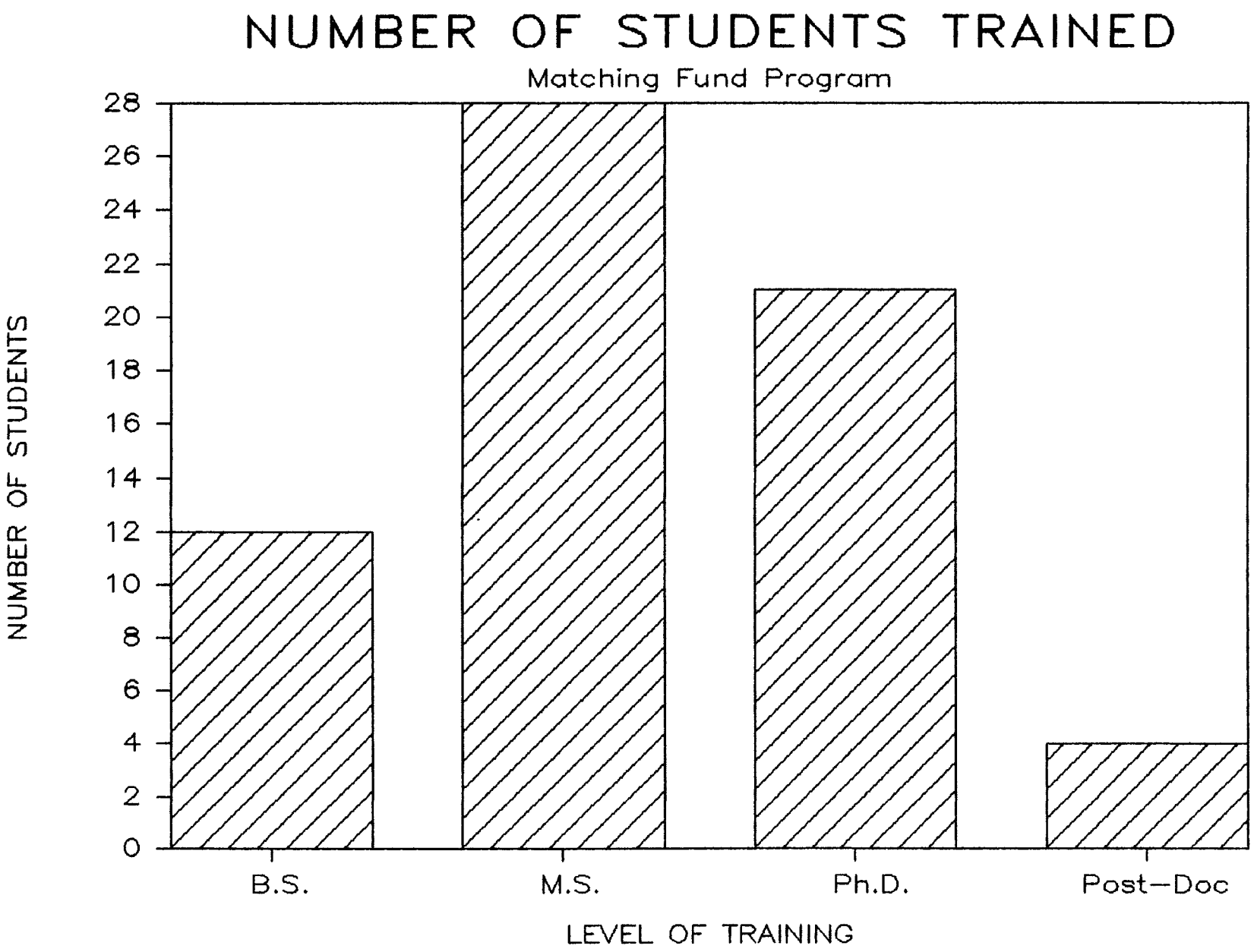

NUMBER OF STUDENTS TRAINED
State Water Resources Research Program
NUMBER OF STUDENTS
60
50
40
30
20
10
0
Nat–Sci
Engr
Phy–Sci
Soc–Sci
AREA OF TRAINING
B.S.
M.S.
Ph.D.

TABLE 4. NUMBER OF STUDENTS TRAINED BY AREA/DISCIPLINE AND LEVEL
FY1975 - FY1984 MATCHING FUND PROGRAM

AREA/DISCIPLINE	LEVEL OF TRAINING				
	Under-Graduate	Masters Degree	Ph.D. Degree	Post-Ph.D.	Total
NATURAL SCIENCE					
Aquatic Ecology	0	1	0	1	2
Biological Science	0	5	0	0	5
Microbiology	3	9	4	1	17
Soil Science	0	0	5	1	6
Sub-Total	3	15	9	3	30
ENGINEERING					
Civil	4	9	6	1	20
Electrical	1	1	0	0	2
Mechanical	1	0	0	0	1
Systems	0	1	4	0	5
Sub-Total	6	11	10	1	28
PHYSICAL SCIENCE					
Chemistry/Physics	2	0	0	0	2
Environmental Chemistry	0	1	1	0	2
Geology/Earth Science	1	0	1	0	2
Sub-Total	3	1	2	0	6
SOCIAL/INSTITUTIONAL SCIENCE					
Political Science	0	1	0	0	1
Sub-Total	0	1	0	0	1
TOTALS FOR PROGRAM	12	28	21	4	65


NUMBER OF STUDENTS TRAINED
Matching Fund Program
NUMBER OF STUDENTS
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
B.S.
M.S.
Ph.D.
Post—Doc
LEVEL OF TRAINING

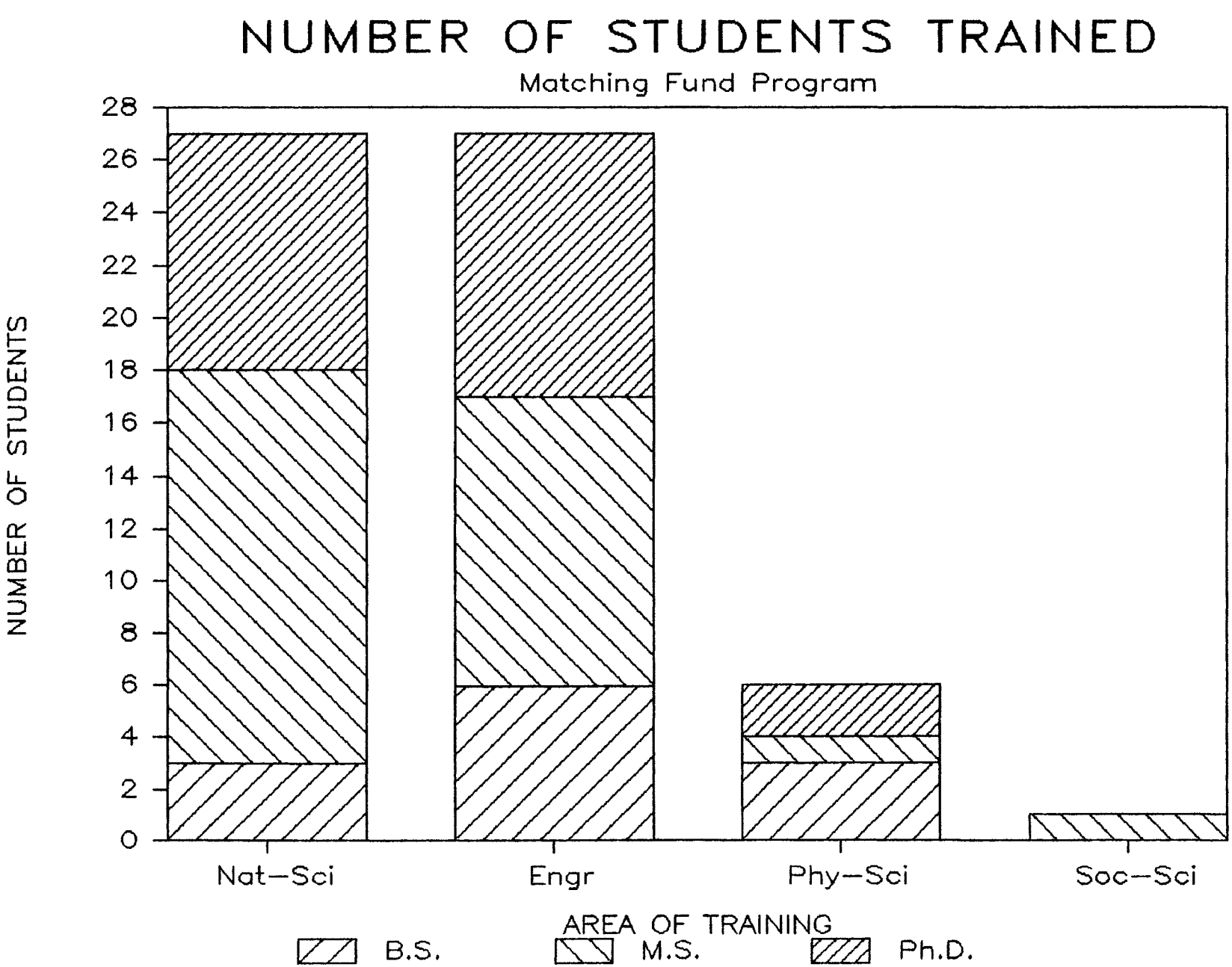

NUMBER OF STUDENTS TRAINED
Matching Fund Program
NUMBER OF STUDENTS
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
Nat—Sci
Engr
Phy—Sci
Soc—Sci
AREA OF TRAINING
B.S.
M.S.
Ph.D.

TABLE 5. CURRENT EMPLOYMENT OF FORMER STUDENTS BY SECTOR
FY1975 - FY1984 WATER RESOURCES CENTER'S RESEARCH PROGRAM

AREA/DISCIPLINE	EMPLOYMENT SECTOR					
	Public			Private	Academic	
	Federal	State	Local		Faculty	Student
NATURAL SCIENCE						
Agronomy	0	0	0	0	0	0
Aquatic Ecology	0	0	0	1	0	0
Biological Science	0	0	1	0	0	2
Botany	1	0	0	0	0	2
Environmental Science	0	0	1	1	0	0
Food Science	0	0	0	0	1	0
Microbiology	2	0	0	8	2	4
Natural Resources	0	1	0	0	0	1
Soil Science	1	0	0	0	0	0
Zoology	0	7	0	0	4	3
Sub-Total	4	8	2	10	7	12
ENGINEERING						
Chemical	0	1	0	2	1	1
Civil	0	2	1	5	4	1
Electrical	0	0	0	0	0	0
Environmental	1	0	0	1	0	0
Industrial	0	0	0	0	0	0
Mechanical	0	0	0	0	0	0
Systems	0	0	0	0	3	0
Sub-Total	1	3	1	8	8	2
PHYSICAL SCIENCE						
Chemistry/Physics	0	0	0	0	0	1
Environmental Chemistry	0	2	0	1	0	0
Geology/Earth Science	1	1	0	1	0	0
Mathematics	0	0	0	0	0	0
Sub-Total	1	3	0	2	0	1
SOCIAL/INSTITUTIONAL SCIENCE						
Journalism	0	0	0	0	0	0
Political Science	0	0	0	0	0	0
Resource Policy	0	0	0	0	0	0
Computer Science	0	0	0	0	0	0
Sub-Total	0	0	0	0	0	0
TOTALS FOR PROGRAM	6	14	3	20	15	15

CHAPTER 6

ACCREDITATION

The Ohio State University in Columbus, Ohio was established in 1879 under the Morrill Act of 1862 as a land grant institution, dedicated to serving the higher educational needs of all people of Ohio. From a student body of twenty-four and a faculty of seven, the University has grown to become the major center for graduate and professional education in Ohio. At the same time, the University has developed a superior and a multi-faceted, educational program that promotes the fine arts, the sciences and the humanities.

The Masters degree is awarded in 106 study areas; the Doctorate in 84. OSU students have the opportunity to select from 197 undergraduate and 205 graduate programs and can choose classes from over 6,000 offerings each year.

Since its first graduating class of six in 1878, The Ohio State University has granted over 340,000 degrees --10,516 in 1984 alone. It is the only university in Ohio offering degree programs in geodetic science, medical communications, medical illustration, natural resources, optometry, and veterinary medicine. It is the only university in the free world offering graduate degrees in welding engineering.

At four regional campuses students may complete two years toward most baccalaureate degree programs. A center at Wright-Patterson Air Force Base provides graduate instruction in technical and professional subjects.

The academic organization of the University is designed to provide an environment of creative thinking and educational freedom that will promote individual growth and professional competency. The University contains 19 colleges and a graduate school, each under the direction of a dean and an associated faculty.

Students entering the University come from a variety of backgrounds. Students enroll from all 88 counties in Ohio, all 50 states, and 100 foreign countries and geographic regions. During Autumn quarter, 1984, 52,434 students enrolled on the Columbus campus of the University, including 45,148 from Ohio, 4,478 from other states and 2,808 from foreign countries.

The University is active in minority and adult education. Because of the metropolitan environment of the University and efforts to attract non-traditional students, minority and adult students have increased during each of the last five years. Off-campus educational opportunities are available through community centers. Expanded evening offerings now make

15 undergraduate and 12 graduate areas available during evening hours. This effort to expand access to the University continues to receive high priority.

Although the University is often considered a city itself, it is also an integral part of Columbus, Ohio, a metropolitan area with a population of more than 1,250,000. The main campus, located two and one-half miles from downtown Columbus, makes the numerous cultural and recreational facilities of the city available to students. As an urban metropolis and state capital, Columbus offers rich research and field experience opportunities.

Columbus, Ohio houses many professional institutions which sustain mutually advantageous professional interactions. These arrangements enrich our research facilitate executive-student-faculty interaction, and provide internships and placement opportunities for our graduates. Among these institutions are: Battelle Memorial Institute, On-Line Computer Library Center, Chemical Abstracts, CompuServe, The State of Ohio, and a variety of industrial, service and manufacturing organizations with national and international operations.

The Ohio State University is fully accredited by the Commission on Institutions of High Education of the North Central Association of Colleges and Secondary Schools, (NCACSS). The following list shows the current status of individual accreditation reviews by Colleges in the University through August, 1985.

0255W

THE OHIO STATE UNIVERSITY

ACCREDITATION REVIEWS
BY COLLEGE

August 8, 1985

ADMINISTRATIVE SCIENCE:
- Business
- Public Administration

AGRICULTURE:
- Agricultural Engineering
- Agricultural Technical Institute
- Agricultural Education
- Forestry Resources Management

ALLIED MEDICAL PROFESSIONS:
- Medical Dietetics
- Association of Medical Illustrators
- Medical Record Administration
- Medical Technology
- Nurse-Anesthesia Training
- Occupational Therapy
- Physical Therapy
- Radiologic Technology
- Respiratory Therapy

ARTS:
- School of Music (Music Education)
- Dance Education
- Industrial Design
- Art Education
- School of Music (Music & Music)
- Dance

DENTISTRY:
- Orthodontics
- Endodontics
- Oral and Macillofacial
- Dental Hygiene
- Dentistry

EDUCATION:
- Teacher Education
- Music Education

ACCREDITATION REVIEWS BY COLLEGE August 8, 1985

ENGINEERING:
- Architecure
- City and Regional Planning
- Landscape Architecture
- Engineering
  - Aero & Astro Engineering
  - Agricultural Engineering
  - Ceramic Engineering
  - Chemical Engineering
  - Civil Engineering
  - Electrical Engineering
  - Industrial & Systems Engr.
  - Mechanical Engineering
  - Metallurgical Engineering
  - Welding Engineering

HOME ECONOMICS:
- Home Economics Education

LAW:
- Law

MATHEMATICAL AND PHYSICAL SCIENCES:
- Chemistry

MEDICINE:
- Anesthesiology (Residency)
- Dermatology
- Doctor of Medicine
- Hospital & Health Services Administration
- Immuno-Hemotology
- Medicine (Residency)
- Neurology (Residency)
- Nurse Anesthesia
- Nurse-Anesthesia Training
- Obstetrics and Gynecology (Residency)
- Otolaryngology (Residency)
- Pathology (Neuro-Pathology)
- Pathology (Residency)
- Pediatrics (Residency)
- Physical Medicine
- Physical Therapy
- Preventive Medicine (Residency)
- Preventive Medicine-Emergency Medicine (Residency)
- Preventive Medicine (General)
- Psychiatry
- Psychiatry - Child Psychiatry
- Psychiatry - Division of Clinical Psychiatry
- Radiologic Technology
- Radiology (Diagnostic)
- Radiology (Division of Nuclear Medicine)
- Radiology (Radiation Oncology)
- Radiology (Therapeutic)

Respiratory Therapy
Surgery - General (Residency)
Surgery - General Surgery
Surgery - Orthopaedic Surgery
Surgery - Pediatric Surgery
Surgery - Neurological Surgery
Surgery - Plastic Surgery
Surgery - Thoracic Surgery
Surgery - Urology

NURSING:
Nursing

OPTOMETRY:
Optometry
Physiological Optics (B.S.)
Physiological Optics (Graduate)

PHARMACY:
American Care Facilities

SOCIAL AND BEHAVIORAL SCIENCES:
Clinical Psychology
Journalism-Broadcast News
Speech and Hearing Clinic Facilities
Audiology-Speech Pathology
Counseling Psychology

SOCIAL WORK:
Social Work (B.S.)
Social Work (Master's)

VETERINARY MEDICINE:
Veterinary Medicine

CHAPTER 7

UNIVERSITY'S PHYSICAL RESOURCES

Research is a basic aspect of graduate education and is an integral part of the program in most academic units of the University. In those cases in which the research interests of faculty and students transcend departmental lines, the University encourages and tries to facilitate interdisciplinary programs through the development of research centers.

Sponsored research at The Ohio State University offers many opportunities for graduate student participation. The sponsored research program is built around the research interests of the faculty and graduate students and draws upon the full research facilities of the University. Through participation in one of the sponsored research projects, graduate students may gain valuable research experience and augment their financial resources. In many instances, thesis problems which qualify for support under a program of sponsored research can be selected.

As one of the major academic research centers in the United States, the University possesses many outstanding research facilities, and is committed to maintaining an atmosphere in which research and scholarship can flourish.

Instruction and Research Computer Center

The Instruction and Research Computer Center is a research and service facility for the faculty, staff, and students of all departments of the University; it is maintained as a unit of the Office of Academic Affairs. The principal objectives of the Computer Center are: to provide training and assistance in the use of digital computers to all University students, faculty, and staff who seek this service; to do research in computing techniques; and to provide computational services for research projects in all fields which require extensive computations.

The major computer systems include an Amdahl 470 V/8, an IBM-4341, and a DECsystem-20. Over 500 time-sharing terminals and 200 microcomputers are available throughout the campus for student use. Special equipment includes graphics terminals, on-line electrostatic and pen plotters, and a digitizer. In addition, IRCC operates many departmental computing laboratories for special projects such as computer-assisted design, computer-assisted modeling, research in computer networks, and data-base research.

University Libraries

With close to four million books, more than two million microforms, and 25,000 journals and other serials on subscription, the Libraries'

collection is by far the largest and most comprehensive in Ohio and ranks 17th largest among university libraries in North America. The collection is accessible through the computerized Library Control System (LCS) by which a researcher can discover within seconds whether a particular book, microfilm or journal is part of the Libraries' collection, whether it is currently available, and where it is located.

Systems offered by the Mechanized Information Center (MIC) provide citations to sources beyond OSU's holdings. Information Specialists at MIC and elsewhere offer computer-based search services in all research disciplines. For example, the Science Search Service scans approximately 15,000 bibliographic citations to new materials every two weeks and sends subscribers an average of 40 update cards with each bi-weekly mailing. Information Specialists are also skilled at accessing hundreds of computerized online systems providing instant access to hundreds of databases in all areas of research, including engineering, chemistry, and biological sciences.

Twenty-one department libraries whose collections are discipline-oriented, are located outside the Main Library, but their holdings are accessible theough LCS. Those of interest to the Water Resources Center's Program include:

-Engineering (includes computer and information sciences, architecture, energy sources, and city and regional planning). 131,000 volumes, 1,100 serial titles.

-Chemistry. 47,000 volumes, 53,000 data sheets and cards, 400 serial titles.

-Geology (includes oceanography, geophysics and minerology). 55,000 volumes, 75,000 maps, 610 serial titles, 28,000 publications of the Geological Survey.

-Mathematics (includes statistics, biostatistics and geodetic sciences). 37,000 volumes, 3,500 pamphlets, 450 serial titles.

-Physics (includes history of the physical sciences). 44,000 volumes, 2,000 technical reports, 300 serial titles.

-Agriculture (includes natural resources and wildlife). 64,000 volumes, 1,200 serial titles.

-Biological Sciences (includes genetics and immunology). 84,000 volumes, 970 serial titles.

Interdisciplinary research

Interdisciplinary research units at The Ohio State University range across a broad spectrum of problem areas, are generally intercollegial in nature, and involve faculty members from a wide variety of disciplines. Such units provide a mechanism for the University to focus its resources

on specific problem areas of an interdisciplinary nature. Some of these Centers include:

-Atmospheric Sciences Program
Thomas A. Seliga, Director

-Bio-Medical Engineering Center
Herman R. Weed, Director

-Campus Chemical Instrument Center
Alan Marshall, Director

-Center for Lake Erie Area Research
Charles E. Herdendorf, Director

-Institute of Polar Studies
David H. Elliot, Director

-Water Resources Center
Robert C. Stiefel, Director

The Campus Chemical Instrument Center and the Electron Optics Laboratory provide University researchers with the most advanced chemical-analysis and physical-imaging equipment available on any campus in the country. A list of their combined facilities would include:

-a Finnigan-4021 gas-chromatograph mass-spectrometer

-a Krotos MS-25 magnetic-sector, gas-chromatograph mass-spectrometer

-a Kratos MS-30 high-resolution mass-spectrometer with Fast-Atom-Bombardment capability

-two Nicolet Fourier-transform nuclear-magnetic-resonance (NMR) spectrometers (300 MHZ and 500 MHZ)

-a Nicolet Fourier-transform mass-spectrometer

-a JEOL 200kV analytical electron microscope, with capabilities for scanning, scanning-transmission, energy-dispersive --ray detection and electron-energy-loss spectrometry

-a Philips EM300 transmission-electron microscope

-a TN-2000 X-ray analyzer

-a PHI Model-595 Multiprobe, a combination scanning-electron microscope and Auger microprobe.

CHAPTER 8

INTERDISCIPLINARY RELATIONSHIPS

When the Water Resources Center was established in 1958, the Board of Trustees assigned it the responsibility of coordinating the interdisciplinary water resources research activities at the University. Several years later, in 1964, the Vice-President for Research at the University assigned the Center the responsibility for the direction and coordination of research support provided by the Interior Department through the State Water Resources Research Program; and directed the estabishment of an Advisory Committee for the Center to ensure that interdisciplinary services would be available to those Departments at the University which had an interest and research capabilities in the water resources field.

The membership on the current Advisory Committee consists of faculty representation from five colleges and eleven departments. In addition, the Ohio Department of Natural Resources, the Ohio Environmental Protection Agency and the District Office of the United States Geological Survey also have appointed members of their staffs to the Committee.

The forty-two research projects that have been supported by the Center during the past ten years have been directed by fifty-five faculty researchers from thirteen disciplines at ten Universities in the State. The number of researchers associated with each of these disciplines is shown in the following tabulation.

Discipline	No. of Researchers
Natural Sciences	
Agronomy	3
Aquatic Ecology	4
Biological Sciences	1
Food Science	1
Microbiology	3
Natural Resources	1
Zoology	9
Engineering	
Chemical	3
Civil	15
Environmental	1
Physical Sciences	
Geology	6
Institutional Sciences	
Journalism	2
Communications	1
	50

CHAPTER 9

ADMINISTRATIVE RELATIONSHIPS

In 1958, the Board of Trustees of The Ohio State University established the Water Resources Center and assigned it the responsibility of coordinating water resources research at the University. In accordance with the Rules of the University, a 'Center' is a non-degree granting administrative unit which coordinates programs of instruction, research, or service representing either an interdisciplinary subject or specialized field of study. It involves a program of interest to the faculty of two or more colleges, schools, departments, divisions, or academic facilities. The chief administative officer of a Center shall be called Director and normally shall have an advisory committee or report to an administrative committee for the Center composed of the deans of the participating colleges; or, if within one college, the administrative heads of the participating units."

The Water Resources Center was an outgrowth of the Waste Treatment Laboratory which had been administered by the Engineering Experiment Station since 1947. The Trustee's, therefore, retained the Executive Director of the Station as the Administrator to whom the Director of the Center would report, although the responsibilities of the Center had increased from an intercollege role to an interdisciplinary activity.

In April of 1964, in anticipation of the passage of the Water Resources Research Act of 1964 (P.L. 88-379), the Vice-President for Research at the University assigned the responsibility for the direction and coordination of research in the water resources area for the University, including research support provided by the 1964 Act, to the Water Resources Center of the Engineering Experiment Station under the administrative leadership of the Executive Director of the Station. The Executive Director of the Station (now Dr. Robert F. Redmond) was to report to the Dean of the College of Engineering (now Dr. Donald D. Glower) who was in turn to report to the Vice-President for Research (now Dr. Jack M. Hollander) on matters relating primary to research, and to the Vice-President for Instruction (now the Office of Academic Affairs and Provost, Acting Vice-President Francille Firebaugh) on matters related primarily to instruction.

The Dean of the College of Engineering was also instructed by the Vice-President for Research to appoint an all-University advisory committee for the new program with responsibilities to:

a. Coordinate the activities of the Water Resources Center with the broad interests of the departments that have research problems in the field to be certain that interdisciplinary services are provided.

b. Review research proposals and make appropriate recommendations.

c. Review the Centers activities and advise the Director of the Water Resources Center regarding the breath and quality of the program.

The advisory committee was to be chaired by the Director of the Center, and its membership was to consist of faculty members who have a working knowledge of the activities of the Water Resources Center.

The administrative relationships that existed at the time of the Center's establishment as the State Water Resources Research Institute in 1964 are still in effect; although, of course, the identities of most of the participants have changed over the years.

The current membership of the Water Resources Advisory Committee is listed in the Introduction to this document. It consists of faculty representatives from five colleges and eleven departments at The Ohio State University and three representatives from the principal water related agencies within the State.

The current Director of the Water Resources Center holds two appointments at the University. The primary appointment, for 60 percent of a twelve month contract, is as a Professor in the Civil Engineering Department; while the secondary appointment, for 40 percent of a twelve month contract, is as a Professor in the Engineering Experiment Station.

The Directors forty percent appointment in the Station is provided as part of the cost-sharing requirements to administer the Annual State Water Resources Research Program, as is another 4.5 percent that is donated by the Civil Engineering Department. A release time appointment of 11.5 percent of the Director's time is charged to the sponsor on the Program by the Civil Engineering Department. In total then, the Director has a time commitment of 55 percent to administer the Program.

The remaining 45 percent of the Director's time is used for teaching, conducting research and providing other services to the Civil Engineering Department. His current research activities include:

"Demonstration Program in the Use of Calcium Fluoride in Fluoridating a Water System," Center for Disease Control, PHS, DHHS, Federal Funds $225,000, three years, 1985-88; with A. J.Rubin.

"Technology Transfer Programs for Ohio," USGS, Federal Funds $19,968, one year, 1985-1986; Principal Investigator.

"Dynamics of Bioavailability of Phosphorus in Lake Erie as Related to Phosphorus Loading," NOAA, Federal Funds $50,000, two years, 1983-1985; Co-Principal Investigator.

The Director's annual teaching load is shown in the following table:

Quarter	Course Title	Hours	Level
Autumn	Industrial Waste Treatment	3	Grad
	or		
	Physical Treatment Processes	3	Grad
Winter	Water Resources Engineering	4	U. G.
Spring	Professionalism & Ethics	1	U. G.
	and		
	Drainage & Water Main Design	3	U. G.

The Director is the Lead Delegate to the Universities Council on Water Resources (UCOWR) and is a member of the Board of Directors; he is Past-Chairman of the National Association of Water Institute Directors (NAWID) and is a member of the Council of Representatives; he serves on the Water Programs Public Advisory Group to the Ohio Environmental Protection Agency and is a member of the Toxics Technical Advisory Committee; and he is a member of the Ohio Inter-Agency Water-Use Data Coordinating Committee for the Ohio District of the U.S. Geological Survey.

The Director is one of the organizers of the newly formed Ohio River Basin Consortium for Education and Research, and is assisting in developing the organization of the newly created International Water Resources Center at Central State University.

CHAPTER 10

UNIVERSITY'S COMMITMENT

The support provided to the Water Resources Center, its Director and its programs by The Ohio State University community comes in many forms and from many sources. It includes physical resources; financial resources; and, most importantly, human resources; and extends from the Board of Trustees and President Edward Jennings to the Department of Physical Facilities and Mr. Frank Baldwin. It involves administrators, deans, chairpersons, faculty, staff and students from the College of Agriculture to the Department of Zoology on campus, and it receives additional support from other Universities, the water-related agencies and other cooperators throughout the State.

The major financial support from the University comes from the College of Engineering. The Engineering Experiment Station contributes forty percent of the Director's time, salary and fringe benefits to the Program and also contributes the full-time services of Mrs. Carol Moody as Secretary to the Director.

The College also provides space, maintenance, equipment, supplies and the utilities for the Center's offices, library, research laboratories and support facilities in the Water Resources Building on the Ohio State University campus. This facility is shared with the Civil Engineering Department's Water Quality Research and Teaching Laboratories; and with the Center for Lake Erie Area Research (CLEAR) for the joint operation of a Water Quality Laboratory and the Water Resources Library.

The Civil Engineering Department contributes an additional fifteen percent of the Director's time and salary to the administration of the State Water Resources Research Program, and provides additional assistance in the areas of personnel and payroll services.

The time and salary contributions to the program from the Engineering Experiment Station and the Department of Civil Engineering for the Director and the Secretary are used to provide some of the one-to-one non-federal to federal dollar match that is required by the Department of Interior's grant for the State Water Resources Research Program; but all of the other expenses related to the Water Resources Building are provided without any charge or cost-sharing benefits to the Program.

Other sources of financial support for the Program include the Universities, Colleges and Departments of the Principal Investigators on the research and technology transfer projects that are included in the Annual Program. These units all contribute funds in the form of donated faculty time, equipment, materials and supplies, staff time, computer time and indirect costs to the non-federal, cost-sharing requirements of

the program grant. The financial budget statements for the FY 1984 and FY1985 Programs are included to demonstrate the level and the source of the commitments that have been made in this manner.

None of these projects include indirect costs as a charge against the sponsors expenses, but all have contributed them as part of the required non-federal cost-sharing. Indirect costs are a real expense to the Universities, for if they are not charged to a sponsor and project, the costs of providing space, utility services, maintenance, administrative services and related items must come from the University's general fund.

A large commitment of time and other resources is also provided by the Colleges and Departments and by the water-related state agencies of the members of the Water Resources Center's Advisory Committee. This group of nineteen professionals spend many hours each year developing policy, reviewing proposals and providing other forms of service to the programs and to the Director of the Center.

The Sponsored Programs Administration has the responsibility of administering the financial aspects of all federally supported research projects at The Ohio State University, and provides service by processing purchase requisitions; travel requests; personnel appointments and payroll; and by monitoring project expenses and contracts. Normally, the costs incurred for these services are paid by the recovery of indirect costs on a project. However, in a program where the indirect funds are used as a matching contribution the costs for providing these services is yet another major commitment to the program.

SF 424 - Section IV
(01/84)

Date Prepared 6/84

OHIO 1984 WATER RESEARCH INSTITUTE PROGRAM
State and Year

PART A. - FINANCIAL ESTIMATE

Direct Costs (Whole $)

Activity & Project NO		Salaries & Wages	Benefits	Travel	Non-Expend. Property	Supplies/Mis. Expenses	Total
01 STIEFEL	FS	7,018	1,204	3,500	-0-	8,278	20,000
	(NFS)	(25,807)	(6,171)	(-0-)	(-0-)	(-0-)	(31,978)
02 FAN	FS	13,873	377	-0-	-0-	1,500	15,750
	(NFS)	(6,120)	(1,800)	(-0-)	(-0-)	(-0-)	(7,920)
03 HERDENDORF	FS	12,960	3,055	-0-	-0-	-0-	16,015
	(NFS)	(3,097)	(542)	(-0-)	(-0-)	(-0-)	(3,639)
04 JOHNSON	FS	12,290	2,738	-0-	-0-	2,000	17,028
	(NF&)	(4,925)	(968)	(-0-)	(-0-)	(500)	(6,393)
05 IEGER/BAKER	FS	7,000	-0-	-0-	-0-	-0-	7,000
	(NFS)	(-0-)	(-0- *)	(-0-)	(-0-)	(1,200)	(1,200 *)
06 LOGAN	FS	9,360	1,800	500	1,000	800	13,460
	(NFS)	(3,911)	(709)	(-0-)	(-0-)	(500)	(5,120)
07 EDFORD/SMITH	FS	12,408	2,804	-0-	-0-	-0-	15,212
	(NFS)	(4,037)	(705)	(-0-)	(-0-)	(1,000)	(5,742)
22 STIEFEL	FS	6,816	1,169	650	-0-	1,900	10,535
	(NFS)	(2,754)	(473)	(-0-)	(-0-)	(-0-)	(3,227)
	FS						
	(NFS)	( )	( )	( )	( )	( )	( )
	FS						
	(NFS)	( )	( )	( )	( )	( )	( )
Total Direct Costs	FS	81,725	13,147	4,650	1,000	14,478	115,000
	(NFS)	(50,651)	(11,368)	(-0-)	(-0-)	(3,200)	(65,219)

Indirect Costs Based on Audited Rates: 45 % of $ 171,019 MTDC (76,959)

Indirect Costs Provided by Cooperating University/ies Heildelberg College (4,081)
*58.3% OF $7,000 (SALARIES) WHICH INCLUDES FRINGE BENEFITS

Total Cost		
	FS	115,000
	(NFS)	(146,259)

PART B. - FINANCIAL PLAN FOR USE OF GRANT DURING PERFORMANCE PERIOD

Mo/Yr Start 01/84 Mo/Yr End 09/85 Duration 21 months

Federal Funds $(1000's)

Interval	10/83-12/83	01/84-03/84	04/84-06/84	07/84-09/84	10/84-12/84	01/85-03/85	04/85-06/85	07/85-09/85	Total
Director's Office		0.5	0.5	1.0	4.7	4.7	4.7	3.9	20.0
R/T & IT Projects				10.0	23.0	23.0	23.0	16.0	95.0
Total		0.5	0.5	11.0	27.7	27.7	27.7	19.9	115.0

SF 424 - Section IV
(11/84)

Date Prepared 4/15/85

1985 OHIO (State) WATER RESOURCES RESEARCH INSTITUTE PROGRAM

PART A. - FINANCIAL ESTIMATE

Direct Costs (Whole $)

	Activity & Project NO	Salaries & Wages	Benefits	Travel	Non-Expend. Property	Supplies/Mis. Expenses	Total
01	Fed S STIEFEL	6,257	1,121	3,500	-0-	9,078	19,956
	(N. Fed S)	(21,463)	(5,510)	(-0-)	(-0-)	(-0-)	(26,973
02	FS FAN	9,200	2,544	-0-	6,200	2,000	19,944
	(NFS)	(9,588)	(418)	(-0-)	(-0-)	(-0-)	(10,006
03	FS PFISTER	7,200	2,544	1,000	-0-	4,500	15,244
	(NFS)	(4,998)	(856)	(-0-)	(-0-)	(-0-)	(5,854
04	FS WHITLATCH	10,028	3,044	-0-	-0-	816	13,888
	(NFS)	(4,646)	(808)	(-0-)	(-0-)	(2,013)	(7,467
05	FS HOBBS	16,236	1,664	1,200	-0-	900	20,000
	(NFS)	(5,639)	(1,297)	(-0-)	(-0-)	(-0-)	(6,936
22	FS STIEFEL	13,588	3,673	650	-0-	2,057	19,968
	(NFS)	(2,738)	(484)	(-0-)	(-0-)	(-0-)	(3,222
	FS						
	(NFS)	( )	( )	( )	( )	( )	(
	FS						
	(NFS)	( )	( )	( )	( )	( )	(
	FS						
	(NFS)	( )	( )	( )	( )	( )	(
	FS						
	(NFS)	( )	( )	( )	( )	( )	(
Total Direct Costs	FS	62,509	14,590	6,350	6,200	19,351	109,000
	(NFS)	(49,072)	(9,373)	(-0-)	(-0-)	(2,013)	(60,458

Indirect costs based on audited rates: 45.0 % of $ 136,322 MTDC (at host university) — F$ 0; NF$ (61,345)

Indirect costs based on audited rates: 48.5 % of $ 26,936 MTDC (at cooperating university/s) — F$ 0; NF$ (13,064)

Total Cost	
FS	109,000
(NFS)	(134,867

PART B. - FINANCIAL PLAN FOR USE OF GRANT DURING PERFORMANCE PERIOD

Mo/Yr Start 7/01/85 Mo/Yr End 06/86 Duration 12 months

Federal Funds S(1000's)

Interval	01/85-03/85	04/85-06/85	07/85-09/85	10/85-12/85	01/86-03/86	04/86-06/86	Total
ogram Management			5	5	5	5	20
esearch Projects/ nf. Tr. Activities			27	21	21	20	89
Total			32	26	26	25	109

PROJECT SUMMARY

NUMBER: A-033-OHIO

TITLE: CHEMICAL ASPECTS OF THE TOXICITY OF CHLORINATED EFFLUENTS

PRINCIPAL INVESTIGATOR: Dr. Alan J. Rubin
Department of Civil Engineering

and

Dr. Richard A. Tubb, Leader
Ohio Cooperative Fishery Unit
The Ohio State University

DURATION: From: 7/01/73 To: 9/30/75

FUNDING: Federal: $24,623.51

CLASSIFICATION: Problem Area: P II A Research Area: R 1 b (6)
State Problem Priority Numbers: 3, 4

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
* Richard L. Shank	Natural Resources	M.S.
* M. A. Elmaraghy	Chemical Engineering	M.S.
Hugh Blocksidge	Civil Engineering	M.S.

Richard L. Shank became Manager, Surveillance and Monitoring Section, Division of Solid and Hazardous Wastes Management, OEPA.

M. A. Elmaraghy is Chief Engineer, Central Ohio District, OEPA.

Hugh Blocksidge is a Project Engineer for a consulting firm.

PUBLICATIONS:

Rubin, A. J., and M. A. Elmaraghy, 1975. "Studies on the Toxicity of Ammonia, Nitrate and Their Mixtures to the Common Guppy." Project Completion Report No. 490X, Water Resources Center, The Ohio State University, Columbus.

* Elmaraghy, M. A., 1975. "Studies on the Toxicity of Ammonia, Nitrate and Mixtures to the Common Guppy." M. S. Thesis, The Ohio State University, Columbus.

* Shank, R. L., 1975. "Toxicity of Sewage Treatment Plant Effluents to Fathead Minnows." M. S. Thesis, The Ohio State University, Columbus.

Rubin, A. J., and M. A. Elmaraghy, 1977. "Studies on the Toxicity of Ammonia, Nitrates and Their Mixtures to Guppies." Water Research, 11:927.

PROJECT SUMMARY

NUMBER: A-034-OHIO

TITLE: PUBLIC INFORMATION ON WATER RESOURCES: CONTENT AND EXPOSURE

PRINCIPAL INVESTIGATOR: Dr. Galen R. Rarick
Department of Journalism
The Ohio State University

Dr. Erik L. Collins
Department of Journalism
The Ohio State University

DURATION: From: 7/01/73 To: 9/30/75

FUNDING: Federal: $11,690.36

CLASSIFICATION: Problem Areas: All Research Area: R 2 a (3)
State Problem Priority Numbers: 1 through 10

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
Donald Beech	Journalism	M.A.
David Fink	Political Science	M.A.
Robert Mazerov	Journalism	M.A.

Note: These three students were in a non-thesis program.

PUBLICATIONS:

Rarick, G. R., 1976. "Public Information on Water Resources in the Lake Erie Tributary Basin of Northern Ohio: Content and Exposure." Project Completion Report No. 446X, Water Resources Center, The Ohio State University, Columbus.

PROJECT SUMMARY

NUMBER: A-035-OHIO

TITLE: STREAM DEOXYGENATION RATES

PRINCIPAL INVESIGATOR: Dr. Robert M. Sykes
Department of Civil Engineering
The Ohio State University

DURATION: From: 7/01/73 To: 9/30/75

FUNDING: Federal: $11,837.02

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 1 b (5)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Stuart Strand	Civil Engineering	M.S.
*	Thomas Lyon	Civil Engineering	M.S.
	Bruce Goff	Civil Engineering	M.S.
	Iftekar Kahn	Civil Engineering	M.S.

Stuart Strand is a faculty member in the School of Forestry at the University of Washington.

Tom Lyon is a Project Engineer for the consulting firm of Black and Veatch in Kansas City, Kansas.

PUBLICATIONS:

Sykes, R. M., 1975. "Stream Deoxygenation Rates." Project Completion Report No. 492X, Water Resources Center, The Ohio State University, Columbus.

* Lyon, T.A., 1973. "A Stochastic Simulation Model of the Streeter-Phelps Oxygen Sag Equation." M. S. Thesis, The Ohio State University, Columbus.

* Strand, S., 1975. "The Statistics of the BOD Parameters." M. S. Thesis, The Ohio State University, Columbus.

PROJECT SUMMARY

NUMBER: A-036-OHIO

TITLE: INVESTIGATION OF VERTICAL MIXING IN THE DISPERSION OF POLLUTANTS IN LAKE ERIE

PRINCIPAL INVESTIGATOR: Dr. F. Merrill Galloway, Jr.
Chemical Engineering Department
Cleveland State University

DURATION: From: 7/01/73 To: 6/30/75

FUNDING: Federal: $17,757.47

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 1 b (5)
State Problem Priority Numbers: 1, 4

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	S. Vakil	Chemical Engineering	M.S.
*	C. Sherman	Chemical Engineering	M.S.
	R. Natarajan	Chemical Engineering	M.S.

PUBLICATIONS:

Galloway, F. M. Jr., 1975. "Investigation of Vertical Mixing in the Dispersion of Pollutants in Lake Erie." Project Completion Report No. 491X, Water Resources Center, The Ohio State University, Columbus.

* Vakil, S., 1975. "Criteria for the Use of Vertical Averaging in Great Lakes Dispersion Models." M. S. Thesis, The Cleveland State University, Cleveland.

* Sherman, C., 1975. "Measurement of the Vertical Diffusivity in Lake Erie." M. S. Thesis, The Cleveland State University, Cleveland.

Galloway, F. M. Jr., 197 . "Criteria for the Use of Vertical Averaging in Environmental Dispersion Models." Water Resources Research,12(5):933-940.

Galloway, F. M. Jr., and S. J. Vakil,1977. "Criteria for the Use of Vertical Averaging in Great Lakes Dispersion Models." Journal of Great Lakes Research, 3(1-2):20-28.

PROJECT SUMMARY

NUMBER: A-037-OHIO

TITLE: THE AQUATIC ENVIRONMENT AND FISH COMMUNITY BELOW HOOVER DAM, FRANKLIN COUNTY, OHIO - A POST IMPOUNDMENT STUDY

PRINCIPAL INVESTIGATOR: Dr. Theodore Cavender
Department of Zoology
The Ohio State University

DURATION: From: 7/01/73 To: 6/30/74

FUNDING: Federal: $5,597.73

CLASSIFICATION: Problem Area: P IV D Research Area: R 2 c (1)
State Problem Priority Number: 6, 7

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
Ronald Crunkilton	Zoology	M.S.
Kathran Chan	Zoology	M.S.
Charles F. Willis	Zoology	M.S.
Chris Yoder	Zoology	M.S.

Chris Yoder is with the Division of Water Quality Monitoring and Assessment, Ohio EPA.

Kathran Chan is a Doctor of Medicine at the Wright State University Medical School

Ronald Crunkilton is a Research Biologist with the Missouri Department of Conservation.

PUBLICATIONS:

Cavender, T., and R. Crunkilton, 1976. "Impact of a Mainstream Impoundment on the Fish Fauna of Big Walnut Creek, a Scioto River Tributary in Central Ohio." Project Completion Report No. 444X, Water Resources Center, The Ohio State University, Columbus.

PROJECT SUMMARY

NUMBER: A-038-OHIO

TITLE: A SIMULATION MODEL OF TRITIUM KINETICS IN A FRESHWATER MARSH

PRINCIPAL INVESTIGATOR: Dr. Theodore Bookout, Leader
Ohio Cooperative Wildlife Research Unit
The Ohio State University

DURATION: From: 7/01/74 To: 3/31/76

FUNDING: Federal: $8,694.14

CLASSIFICATION: Problem Area: P I A Research Area: R 2 a (2)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Gary C. White	Zoology	Ph.D.

Dr. Gary C. White is an Assistant Professor in the Department of Wildlife Biology at the Colorado State University.

PUBLICATIONS:

Bookout, T. A., and G. C. White, 1976. "A Simulation Model of Tritium Kinetics in a Freshwater Marsh." Projection Completion Report No. 487X, Water Resources Center, The Ohio State University, Columbus.

** White, G. C., 1976. "A Simulation Model of Tritium Kinetics in a Freshwater Marsh." Ph. D. Dissertation, The Ohio State University, Columbus.

White, G. C., L. W. Adams, and T. A. Bookout, 1977. "Simulation Model of Tritium Kinetics in a Freshwater Marsh." Health Physics, 34:45.

Adams, L. W., G. C. White, and T. J. Peterle, 1975. "Tritium Kinetics in a Freshwater Marsh." 4th Nat. Symp. on Radioecology (Dowden, Hutchinson and Ross, Stroudsburg, Penn.).

PROJECT SUMMARY

NUMBER: A-039-OHIO

TITLE: THE PREDICTION OF ALGAE, NUTRIENT, OXYGEN AND SLUDGE CONCENTRATIONS IN A STRATIFIED LAKE

PRINCIPAL INVESTIGATOR: Dr. Keith W. Bedford
Department of Civil Engineering
The Ohio State University

DURATION: From: 7/01/74 To: 6/30/75

FUNDING: Federal: $9,224.71

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 1 b (5)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	C. Babajimopolous	Agronomy/Civil Engr.	Ph.D.
**	Kenneth Smarkel	Civil Engineering	Ph.D.

PUBLICATIONS:

** C. Babajimopolous and K. Smarkel began their dissertations on the project and completed them on Project B-063-OHIO, which was a continuation of this project. Please refer to Project Summary B-063-OHIO for details on student training and publications for this project.

PROJECT SUMMARY

NUMBER: A-040-OHIO

TITLE: METHANE IN LAKE ERIE: ANALYSIS OF MECHANISMS OF PRODUCTION AND OF AMOUNTS PRODUCED

PRINCIPAL INVESTIGATOR: Dr. James I. Frea
Department of Microbiology
The Ohio State University

DURATION: From: 7/01/74 To: 3/31/76

FUNDING: Federal: $9,557.07

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 1 a (2)
State Problem Priority Number: 1, 4

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Gail Mallard	Microbiology	Ph.D.
* /**	Thomas Ward	Microbiology	M.S./Ph.D.

Dr. Gail Mallard is a staff scientist with the U. S. Geological Survey.

Dr. Thomas Ward is a research scientist in the Environmental Safety Division of Procter and Gamble.

PUBLICATIONS:

Frea, J. I., T. E. Ward, and G. E. Mallard, 1977. "Methane in Lake Erie: Analysis of Mechanisms of Production and of Amounts Produced." Project Completion Report No. 488X, Water Resources Center, The Ohio State University, Columbus.

** Mallard, G. E., 1975. "A Comparative Study of Hydrogen Utilization and Methane Generation by Pure Cultures of Methane Producing Bacteria." Ph. D. Dissertation, The Ohio State University, Columbus.

* Ward, T. E., 1977. "Methogenesis and the Sediment Distribution of Methogenic Bacteria in Lake Erie and Cleveland Harbor." M. S. Thesis, The Ohio State University, Columbus.

** Ward, T. E., 1979. "Anaerobic Microbial Processes in the Sediments of Cleveland Harbor and the Cuyahoga River." Ph. D. Dissertation, The Ohio State University, Columbus.

Ward, T. E., and J. I. Frea, 1979. "The Estimation of Microbial Activities in Lake Sediments by Measurement of Sediment Gas Evolution." Am. Soc. Testing Materials, Special Tech. Pub. 673:156.

PROJECT SUMMARY

NUMBER: A-041-OHIO

TITLE: COAL GASIFICATION IN SOUTHEASTERN OHIO: WATER SUPPLY AND DEMAND

PRINCIPEL INVESTIGATOR: Dr. Elbert E. Whitlatch, Jr.
Department of Civil Engineering
The Ohio State University

Dr. Keith W. Bedford
Department of Civil Engineering
The Ohio State University

DURATION: From: 7/01/74 To: 9/30/75

FUNDING: Federal: $9,829.47

CLASSIFICATION: Problem Area: P I A Research Area: R 1 b (2)
State Problem Priority Number: 8, 10

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Kristine Rebholz	Civil Engineering	M.S.
	Nageshwar Bhaskar	Civil Engineering	Ph.D.

PUBLICATIONS:

Whitlatch, E. E. Jr., 1975. "Coal Gasification in Southeastern Ohio: Water Supply and Demand." Project Completion Report No. 489X, Water Resources Center, The Ohio State University, Columbus.

* Rebholz, K. A., 1975. "Water Requirements and Availabilities for Coal Gasification in Southeastern Ohio." M. S. Thesis, The Ohio State University, Columbus.

Whitlatch, E. E. Jr., 1977. "Coal Gasification and Water Resource Development." Journal of the Water Resources Planning and Management Division, Proceedings, American Society of Civil Engineers, 103, No. WR2: 299-314.

PROJECT SUMMARY

NUMBER: A-042-OHIO

TITLE: MERCURY ASSOCIATION WITH PLANKTON, MICROPARTICULATES AND THE WATER COLUMN IN WESTERN LAKE ERIE

PRINCIPAL INVESTIGATOR: Dr. Robert Pfister
Department of Microbiology
The Ohio State University

DURATION: From: 1/01/75 To: 6/30/76

FUNDING: Federal: $9,811.53

CLASSIFICATION: Problem Area: P II A Research Area: R 1 b (5)
State Problem Priority Number: 3, 4

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	James Parsons	Microbiology	Ph.D.
	Barbara Maynard	Microbiology	M.S.
	Frank Brigano	Microbiology	M.S.
	Monica Warmenhoven	Microbiology	B.S.

Dr. James Parsons is a faculty member in the Department of Microbiology at Bloomsburg State Teachers College.

Dr. Frank Brigano is Chief Scientist at the Olin Chemical Company and is working with biocides in the aquatic environment.

Barbara Maynard worked in the Department of Microbiology at OSU for five years in the area of general and aquatic microbiology.

PUBLICATIONS:

Pfister, R., 1976. "Mercury Association with Plankton, Microparticulates and the Water Column in Western Lake Erie." Project Completion Report No. 501X, Water Resources Center, The Ohio State University, Columbus.

** Parsons, J. E., 1977. "Mercury Translocations as Mediated by Metabiosis." Ph.D. Dissertation, The Ohio State University, Columbus.

Titus, J. A., J. E. Parsons, and R. M. Pfister, 1980. "Translocation of Mercury and Microbial Adaptation in a Model Aquatic System." Bulletin of Environmental Contamination and Toxicology 25(3):456-464.

PROJECT SUMMARY

NUMBER: A-043-OHIO

TITLE: EFFECTS OF PROCESS DESIGN ON REDUCED WATER USES AND WASTES IN DAIRY PROCESSING

PRINCIPAL INVESTIGATOR: Dr. W. James Harper
Department of Food Science
The Ohio State University

Dr. Elbert E. Whitlatch, Jr.
Department of Civil Engineering
The Ohio State University

DURATION: From: 1/01/75 To: 6/30/76

FUNDING: Federal: $8,293.22

CLASSIFICATION: Problem Area: P I A Research Area: R 2 b (1)
State Problem Priority Number: 10

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Roy E. Carawan	Food Science	Ph.D.
	Scott McGee	Biological Sciences	B.S.

Dr. Roy E. Carawan is an Associate Professor of Food Engineering at North Carolina State University specializing in water and waste management in food plants.

PUBLICATIONS:

Harper, W. J., and R. E. Carawan, 1980. "Effects of Process Design on Reduced Water Uses and Wastes in Dairy Processing." Project Completion Report No. 502X, Water Resources Center, The Ohio State University, Columbus.

** Carawan, R.E., 1977. "Effect of Process Modifications on the Reduction of Water Use and Waste in a Case Study Dairy Plant." Ph.D., Dissertation, The Ohio State University, Columbus.

Hansen, A.P.,S. Saad, V. A. Jones and R. E. Caraean, 1976. "Analysis of Lipids in Dairy Wastewaters." J. Dairy Science 59:1222-25.

Carawan, R. E., 1977. "Employee Training Program in Water and Waste Management."Am. Dairy Review39(12):12-18.

Carawan, R. E., and V. A. Jones, 1977. "Water and Waste Management Program for Dairy Processing." J. Dairy Science60(7):1192-97.

Harper, W.J., and R. E. Carawan, 1977. "Approaches to Minimizing Water Usage and Waste in Dairy Plants." The Milk Industries, Great Britian 79:3-8.

Carawan, R. E., V.A. Jones and A. P. Hansen, 1978. "Water and Wastewater Management in Dairy Processing Plants." Water Research in Action 3(2).

Carawan, R. E., J. V. Chambers, R. R. Zall and R. H. Wilkowske, 1979. "Dairy Processing Water and Wastewater Management." Extension Special Report No. AM-18b. The North Carolina Agricultural Extension Service, North Carolina State University, Raleigh, N.C. 27650.

Carawan, R. E., V. A. Jones and A. P. Hansen, 1979. "Water Use in a Multiproduct Dairy." J. Dairy Science 62(8): 1238-42.

Carawan, R. E., V. A. Jones and A. P. Hansen, 1979. "Wastewater Characterization in a Multiproduct Dairy." J. Dairy Science62(8):1243-51.

Harper, W. J., and R. E. Carawan. "Approaches to Minimizing Water Usage and Waste in Dairy Plants." 1978 Seminar on Dairy Effluents, International Dairy Federation, Brussels, Belgium.

PROJECT SUMMARY

NUMBER: A-044-OHIO

TITLE: A NEW METHOD FOR REMOVING TRACE METALS BY ADSORPTION

PRINCIPAL INVESTIGATOR: Dr. Alan J. Rubin
Department of Civil Engineering
The Ohio State University

DURATION: From: 7/01/75 To: 12/31/77

FUNDING: Federal: $35,853.96

CLASSIFICATION: Problem Area: P II A Research Areas: R 2 b (1) and (3)
State Problem Priority Number: 3

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Dan Mercer	Environmental Chemistry	M.S.
	Campbell Amos	Environmental Science	M.S.
	Mary Rozich	Environmental Science	M.S.
	Steven Ruben	Microbiology	B.S.

Dan Mercer was formerly a Senior Analyst in the OEPA Mobile Laboratory and is now the director of the quality control laboratory for a steel company in Pittsburgh.

Campbell Amos works for an industrial firm that specializes in environmental control.

Mary Rozich is employed by the Franklin County Engineers Office.

Steve Ruben is currently working on his Ph. D. in biochemistry at the University of Cincinnati.

PUBLICATIONS:

Rubin, A. J., 1978. "A New Method of Removing Trace Metals by Adsorption." Project Completion Report No. 541X, Water Resources Center, The Ohio State University, Columbus.

* Mercer, D. L., 1975. "Adsorption of Free and Complexed Cadmium from Solution by Activated Carbon." M. S. Thesis, The Ohio State University, Columbus.

Rubin, A. J., and D. L. Mercer, 1981. "Adsorption of Free and Complexed Metals by Activated Carbon." In: Adsorption of Inorganics at Solid-Liquid Interfaces, Ann Arbor Science, Ann Arbor, Michigan.

PROJECT SUMMARY

NUMBER: A-045-OHIO

TITLE: MATHEMATICAL MODEL OF HEAVY METAL TRANSFER AND TRANSPORT IN LAKE ERIE

PRINCIPAL INVESTIGATOR: Dr. Lester J. Walters, Jr.
Department of Geology
Bowling Green State University

DURATION: From: 7/01/75 To: 9/30/77

FUNDING: Federal: $28,640.00

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 2 a (2)
State Problem Priority Number: 4

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
	Rolf Pestel	Geology	B.S.
	Gordon Yahney	Geology	M.S.
	Marcia Houghton	Geology	M.S.
	Dale Borowiak	Mathematics	M.S.
*	David Drain	Mathematics	M.S.

PUBLICATIONS:

Walters, L. J. Jr., and D. C. Drain, 1979. "Mathematical Model of Heavy Metal Transfer and Transport in Lake Erie." Project Completion Report No, 549X, Water Resources Center, The Ohio State University, Columbus.

* Drain, D. C., 1979. "Mathematical Model of Transfer and Transport in Lake Erie." M. S. Thesis, Bowling Green State University.

Walters, L. J. Jr., and C. E. Herdendorf, 1975. "Use of Mercury Pollution in Sandusky Bay Sediments to Determine Sedimentation Rates," Proceedings Sandusky River Basin Symposium, International Joint Commission, Pollution from Land Use Reference Group, pp. 425-453.

Walters, L. J. Jr., 1977. "Man's Input of Mercury, Chromium and Nickel to Lake Erie Sediments." Abs.20th Conf. Great Lakes Research, International Association of Great Lakes Research.

PROJECT SUMMARY

NUMBER: A-046-OHIO

TITLE: OPTIMIZATION METHODS FOR WATER SUPPLY RESERVOIR DESIGN: DEVELOPMENT AND CASE STUDIES

PRINCIPAL INVESTIGATOR: Dr. Elbert E. Whitlatch, Jr.
Department of Civil Engineering
The Ohio State University

DURATION: From: 7/01/75 To: 3/31/77

FUNDING: Federal: $11,233.85

CLASSIFICATION: Problem Area: P IV D Research Area: R 2 c (3)
State Problem Priority Number: 6

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Nageshwar Bhaskar	Civil Engineering	Ph.D.

Dr. Nageshwar Bhaskar is an Assistant Professor of Civil Engineering at the University of Louisville and is teaching water resources engineering.

PUBLICATIONS:

Whitlatch, E. E. Jr., and N. Bhaskar, 1977. "Application of Mathematical Optimization Methods for Reservoir Design and Management Studies." Project Completion Report No. 525X, Water Resources Center, The Ohio State University, Columbus.

** Bhaskar, N., 1978. "Application of Mathematical Optimization Techniques in Reservoir Design and Management Studies." Ph. D. Dissertation, The Ohio State University, Columbus.

Bashkar, N., and Whitlatch, E. E. Jr., 1980. "Derivation of Monthly Reservoir Release Policies." Water Resources Research 16:(6):987-93.

PROJECT SUMMARY

NUMBER: A-047-OHIO

TITLE: TRANSFER OF PUBLIC PARTICIPATION, EDUCATION AND COMMUNICATION TECHNOLOGY TO COASTAL ZONE MANAGEMENT PROGRAMS

PRINCIPAL INVESTIGATOR: Dr. Leonard Hawes
Department of Communication
The Ohio State University

DURATION: From: 7/01/75 To: 9/30/76

FUNDING: Federal: $12,847.05

CLASSIFICATION: Problem Area: P IV A Research Area: R 2 c (6)
State Problem Priority Number: 6

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Dale Manty	Resource Policy	Ph.D.

PUBLICATIONS:

** Manty, D., 1982. "Development of a Paradign for Designing Public Communication Programs for Coastal Resources Management." Ph. D. Dissertation, The Ohio State University, Columbus.

Manty, D., 198 . "Public Participation in Programs of Coastal Zone Management. Third National Conference on Coastal Zone Management, Asilomar, California, Conference Report, Office of Coastal Zone Management, NOAA, U.S. Dept. of Commerce.

Glasser, R., G. Nehman, and D. Manty, 1975. "Public Participation in Water Resources Planning in the U.S." Proceedings IWR/UNESCO Conference on International Water Resources Education, Paris and Strasbourg, France.

Hawes, L. C., 1975. "Public Participation in Water Resources Management in the Great Lakes." Proceedings Conference on Public Participation, International Joint Commission, SSELA, Ann Arbor, Michigan.

Hawes, L. C., 1976. "How Writing is Used in Talk." Quarterly Journal of Speech.

PROJECT SUMMARY

NUMBER: A-048-OHIO

TITLE: PRODUCTION OF GREAT LAKES ZOOPLANKTON

PRINCIPAL INVESTIGATOR: Dr. David A. Culver
Department of Zoology
The Ohio State University

DURATION: From: 7/01/76 To: 6/30/79

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 1 a (2)
State Problem Priority Number: 7

FUNDING: Federal: $31,014.50

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	David Bean	Zoology	M.S.
*	Mary Boucherle	Zoology	M.S.
	Violeta Ramos	Zoology	B.S.
	Ralph Vaga	Zoology	M.S.
	Eric Osman	Computer Science	B.S.

PUBLICATIONS:

Culver, D. A., 1980. "Productivity of Great Lakes Zooplankton." Project Completion Report No. RF 710799, Water Resources Center, The Ohio State University, Columbus.

* Bean, D. J., 1980. "Secondary Production of Zooplankton in the Open Water Zone of Lake Erie." M. S. Thesis, The Ohio State University.

* Boucherle, M. M., 1977. "Dry Weight Estimates of Biomass of Ten Taxa of Crustacean Zooplankters from Lake Erie." M. S. Thesis, The Ohio State University.

Culver, D. A., 1980. "Seasonal Variation in the Sizes at Birth and at First Reproduction in Cladocera." In: W. C. Kerfoot (ed.) The Evolution and Ecology of Zooplankton Communities. American Society of Limnology and Oceanography Special Symposium 3:358-66. University Press of New England.

Culver, D. A., and W. R. DeMott, 1978. "Production of Zooplankton at Nearshore Stations in Lakes Ontario and Erie." Verh. Internat. Verein. Limnol. 20:252-56.

Culver, D. A., M. A. Boucherle, D. J. Bean, and J. W. Fletcher, 1985. "Biomass of Great Lakes Zooplankton from Length-Weight Regressions." Canadian Journal of Fisheries and Aquatic Sciences 42(8).

PROJECT SUMMARY

NUMBER: A-049-OHIO

TITLE: GREAT BLUE HERON AS ENVIRONMENTAL INDICATORS: IMPORTANCE OF FEEDING SITE LOCATION

PRINCIPAL INVESTIGATOR: Dr. Gerald A. Grau
Department of Zoology
The Ohio State University

DURATION: From: 10/01/76 To: 6/30/79

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 2 a (1)
State Problem Priority Number: 7

FUNDING: Federal: $16,785.36

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
* Robert Parris	Biology/Zoology	M.S.

Robert Parris is currently a Ph. D. Candidate at SUNY - Potsdam.

PUBLICATIONS:

Grau, G. A., and R. W. Parris, 1979. "Great Blue Heron as Environmental Indicators: Importance of Feeding Site Location." Project Completion Report No. RF 710800, Water Resources Center, The Ohio State University, Columbus.

* Parris, R. W., 1979. "Aspects of Great Blue Heron (Ardea herodias) Foraging Ecology in Southwestern Lake Erie." M. S. Thesis, The Ohio State University, Columbus.

Parris, R. W., and G. A. Grau, 1979. "Feeding Sites of Great Blue Herons in Southwestern Lake Erie." Proc. Colonial Waterbird Group, pp. 110-113.

PROJECT SUMMARY

NUMBER: A-050-OHIO

TITLE: ACID MINE POLLUTION: EFFECTS ON SURVIVAL, REPRODUCTION AND AGING OF STREAM BOTTOM MICROINVERTEBRATES

PRINCIPAL INVESTIGATOR: Dr. William D. Hummon
Department of Zoology
Ohio University

DURATION: From: 7/01/76 To: 6/30/79

FUNDING: Federal: $29,062.00

CLASSIFICATION: Problem Area: P II B Research Area: R 1 b (1)
State Problem Priority Number: 1

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Wayne Evans	Zoology	Ph.D.
**	Margaret Hummon	Botany	Ph.D.
*	Frank Doherty	Chemistry/Physics	M.S.
*	Robert Wainberg	Zoology	M.S.

Dr. Wayne Evans teaches Health Sciences Computer Program at Ohio University.

Dr. Margaret Hummon is working on her Post Ph.D. in Zoology and Biomedical Sciences at Ohio University.

Frank Doherty received his Masters from Ohio University and is presently a Ph.D. candidate at Virginia Polytechnic Institute and State University in Blacksburg.

Dr. Robert Wainberg is an Instructor of Biology at the University of Tennessee.

PUBLICATIONS:

Hummon, W. D., 1979. "Acid Mine Pollution: Effects on Survival, Reproduction and Aging of Stream Bottom Microinvertebates." Project Completion Report No. RF 710801, Water Resources Center, The Ohio State University, Columbus.

** Evans, W. A., 1979. "Meofaunal Abundance in Sandbars of Acid Mine Polluted, Reclaimed and Unpolluted Streams in Southwestern Ohio." Ph. D. Dissertation, Ohio University, Athens.

** Hummon, M. R., 1979. "Reduction in Fitness of the Gasrotrich Lepiododermella sqummata by dilute Acid Mine Water and Ameloration of the Effect by Carbonates." Ph. D. Dissertation, Ohio University, Athens.

* Doherty, F. G., 1978. "A Preliminary Study on the Toxic Mode of Action of Acid Mine Water on Aquatic Invertebrates." M. S. Thesis, Ohio University, Athens.

* Wainberg, R. H., 1978. "Morphological Variability of the Eutardigrade Isohypsibius saltursus in an Unpolluted Ohio Stream; with Notes on the Tarigrada Found in the Acid Mine Polluted Reclaimed and Other Non-Polluted Streams in Southeastern Ohio." M. S. Thesis, Ohio University, Athens.

Doherty, F. G. and, W. D. Hummon, 1978. "A Preliminary Study on the Toxic Mode of Action of Acid Mine Water on Aquatic Invertebraters (Ephemeroptera, Plecoptera) Through Respirometry." Amer. Zool. 18:632, (1978).

Wainberg, R. H., 1978. "Morphological Variability of the Eutardigrade Isohypsibius saltursus in an Unpolluted Ohio Stream." Amer. Zool. 18:644. (1978).

Hummon, W. D., 1978. "Meofaunal Abundance in Southeastern Ohio Stream Bars," Amer. Zool. 18:660.

Hummon, W. D., W. A. Evans, M. R. Hummon, F. G. Doherty, R. H. Wainberg, and W. S. Stanley, 1978. "Meofaunal Abundance in Sandbars of Acid Mine Polluted, Reclaimed and Unpolluted Streams in Southwestern Ohio." In: J. H. Thorp and J. W. Gibbons, eds. Energy and Environmental Stress in Aquatic Ecosystems, DOE Symposium Series (CONF-771114), NTIS, Springfield, Virginia.

Hummon, M. R. and W. D. Hummon, 1979. "Reduction in Fitness of the Gasrotrich Lepidodermella squammata by Dilute Acid Mine Water and Ameloration of the Effect by Carbonates," Intern. J. Invert. Repro., 1:297-306.

Hummon, W. D. and D. P. Bevelhymer, "Life Table Demography of the Rotifer Lecane tenuiseta Under Culture Conditions and Various Age Distributions," Hydrobiologia,

PROJECT SUMMARY

NUMBER: A-051-OHIO

TITLE: PRELIMINARY ESTIMATES OF GROUND-WATER RECHARGE RATES, RELATED STREAMFLOW AND WATER QUALITY IN OHIO

PRINCIPAL INVESTIGATOR: Dr. Wayne A. Pettyjohn
Department of Geology
The Ohio State University

DURATION: From: 7/01/76 To: 9/30/77

CLASSIFICATION: Problem Areas: P I and P II Research Area: R 1 a (2)
State Problem Priority Numbers: 1, 7

FUNDING: Federal: $15,530.62

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Roger Henning	Earth Science	Ph.D.
	Tim Croll	Geology	B.S.
	Joseph Studlick	Geology	M.S.
	Richard Bain	Geology	M.S.

PUBLICATIONS:

Pettyjohn, W. A., and R. Henning, 1979. "Preliminary Estimate of Ground-Water Recharge Rates, Related Streamflow and Water Quality in Ohio," Project Completion Report No. 552X, Water Resources Center, The Ohio State University, Columbus.

** Henning, R.J., 1978. "The Ground Water Interface in Ohio." Ph. D. Dissertation, The Ohio State University.

Pettyjohn, W. A., and R. Henning, 1977. "Ground-Water Recharge Rates in Ohio." Geological Society of America, North Central Section, 5:212.

Henning, R., W. A. Pettyjohn, and J. Studlick, 1978. "Regional Groundwater Quality in Ohio." Ohio Journal of Science 788:35.

Henning, R., and W. S. Pettyjohn, 1978. "Compter Programs as an Aid to Hydrogeological Reconnaissance". Geological Society of America, North Central Section, 6:256.

PROJECT SUMMARY

NUMBER: A-052-OHIO

TITLE: DEVELOPMENT OF A COMPUTER PROGRAM FOR A LINEARIZED SUBHYDROGRAPH METHOD FOR URBAN RUNOFF DETERMINATION

PRINCIPAL INVESTIGATOR: Dr. Simsek Sarikelle
Department of Civil Engineering
University of Akron

DURATION: From: 10/01/76 To: 9/30/77

CLASSIFICATION: Problem Area: P II B Research Area: R 2 a (2)
State Problem Priority Number: 1, 5, 6

FUNDING: Federal: $14,392.00

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Gary French	Civil Engineering	M.S.
	Donald Williams	Civil Engineering	M.S.

Gary French is a Systems Engineer and the Area Manager for the Colonial Pipeline Company in North Carolina.

Donald Williams is the Deputy City Engineer for Corona, California.

PUBLICATIONS:

Sarikelle, S., 1977. "Development of Computer Program for Linearized Subhydrographs Method for Urban Runoff Determination." Project Completion Report No. 556X, Water Resources Center, The Ohio State University, Columbus.

* French, G., 1977. "Development of Linearized Subhydrographs Urban Runoff Computer Model." M. S. Thesis, University of Akron.

Sarikelle, S., 1978. "Development of Linearized Subhydrographs Urban Runoff Computer Model." Proceedings International Symposium on Urban Storm Management, University of Kentucky, Lexington, Kentucky, July 24-27.

Sarikelle, S., 1978. "Verification of Linearized SUBHYD Urban Runoff Computer Model." Proceedings 26th Annual Hydraulics Division Specialty Conference, ASCE, University of Maryland, College Park, Maryland, August 9-11.

PROJECT SUMMARY

NUMBER: A-053-OHIO

TITLE: EVALUATION OF ALUMINUM SULFATE FOR PHOSPHORUS CONTROL IN EUTROPHIC LAKES

PRINCIPAL INVESTIGATOR: Dr. G. Dennis Cooke
Department of Zoology
Kent State University

DURATION: From: 3/01/78 To: 9/30/78

CLASSIFICATION: Problem Area: P II B Research Areas: R 2 b (1) and (3)
State Problem Priority Number: 3

FUNDING: Federal: $9,033.00

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Mary Moffett	Zoology	M.S.
	William James	Botany	M.S.
	Adrienne Koermondy	Botany	M.S.
	Alice Warner	Zoology	M.S.

Mary Moffett is currently a Ph.D. candidate in Zoology at Kansas State University.

William James is a Research Associate with the Army Corp. of Engineers in Environment in Vicksburg, Mississippi.

Dr. Adrienne Koermondy is currently working on her Post-Doctorate degree in Biology on a Fellowship at the University of Pittsburgh.

Alice Warner is the head lab technician in the Biology Department at Kent State University.

PUBLICATIONS:

Cooke, G. D., 1979. "Evaluation of Aluminum Sulfate for Phosphorus Control in Eutrophic Lakes." Project Completion Report No. RF 710796, Water Resources Center, The Ohio State University, Columbus.

* Moffett, Mary F. ,1979. "Changes in the Micro Crustacean Communities of East and West Twin Lakes, Ohio Following Lake Restoration". M. S. Thesis, Kent State University.

Cooke, G.D., R. T. Heath, R.H. Kennedy, & M. R. McComas, 1982. "Change in Lake Trophic State and Internal Phosphorus Release After Aluminum Sulfate." Water Resources Bulletin 18:699-705.

Kennedy, R. H. & G. D. Cooke, 1982. "Control of Lake Phosphorus with Aluminum Sulfate: Dose Determination and Application Technique." Water Resources Bulletin 18:389-395.

PROJECT SUMMARY

NUMBER: A-054-OHIO

TITLE: CHEMICAL TREATMENT FOR THE REMOVAL OF TRACE ORGANICS IN WATER

PRINCIPAL INVESTIGATOR: Dr. Alan J. Rubin
Department of Civil Engineering
The Ohio State University

DURATION: From: 10/01/77 To: 9/30/79

CLASSIFICATION: Problem Area: P II A Research Area: R 2 b (1)
State Problem Priority Number: 3

FUNDING: Federal: $12,182.97

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Paul R. Schroeder	Environmental Engineering	Ph.D.
	David Teeple	Industrial Engineering	B.S.

Dr. Paul Schroeder is an Engineer at the U. S. Army Waterways Experiment Station in Vicksburg, Mississippi.

PUBLICATIONS:

Rubin, A. J., and P. R. Schroeder, 1984. "Coagulation and Restabilization of Particulate, Macromolecular and Protected Organic Aquasols by Aluminum(III)." Project Completion Report No. RF 711522, Water Resources Center, The Ohio State University, Columbus.

** Schroeder, P. R., 1984. "Coagulation of Restabilization of Organic Sols by Aluminum(III) and Neutral Salts. " Ph. D. Dissertation, The Ohio State University, Columbus.

Rubin, A. J., and R. J. Kramer, 1982. "Recovery of Fine-Particle Coal by Colloid Flotation." Separation Sci. Technol. 17:535.

Rubin, A. J., P. R. Schroeder, and R. J. Kramer, 1980. "Clarification of Blackwater Wastes by Flotation and by Coagulation." Proc. Purdue Industrial Wastes Conf. 35:316.

Schroeder, P. R., and A. J. Rubin, 1984. "Aggregation and Restabilization of Colloid Coal with Aluminum(III) and Neutral Salts." Environ. Sci. Technol. 18:264.

PROJECT SUMMARY

NUMBER: A-055-OHIO

TITLE: DEVELOPMENT OF A MATHEMATICAL MODEL FOR URBAN RUNOFF QUANTITY AND QUALITY

PRINCIPAL INVESTIGATOR: Dr. Simsek Sarikelle
Department of Civil Engineering
The University of Akron

DURATION: From: 10/01/77 To: 9/30/79

CLASSIFICATION: Problem Areas: P I and II Research Area: R 2 a (2)
State Problem Priority Numbers: 1, 5, 6

FUNDING: Federal: $11,921.00

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Yu Tang Chuang	Civil Engineering	M.S.
	Matthew Eckert	Civil Engineering	M.S.

Mr. Yu T. Chuang is a Ph. D. Candidate at the University of Akron.

Mr. Matthew Eckert was formerly a Hydrologist at the consulting firm of Woodward Clyde in California. He is currently a Ph. D. Candidate at the University of Akron.

PUBLICATIONS:

Sarikelle, S., 1980. "Development of a Mathematical Model for Urban Runoff Quantity and Quality." Project Completion Report No. RF 710797, Water Resources Center, The Ohio State University, Columbus.

* Chuang, Y. T., 1980. "Storm Water Modeling: Quality and Quantity." M. S. Thesis, University of Akron.

Sarikelle, S., 1980. "A Simplified Quantity and Quality Computer Model for Urban Stormwater Systems." Proceedings of EPA-SWMM User's Meeting, Toronto, Canada, June 19-20.

PROJECT SUMMARY

NUMBER: A-056-OHIO

TITLE: MODEL OF SOIL EROSION BY SURFACE RUNOFF

PRINCIPAL INVESTIGATOR: Dr. T. H. Wu
Department of Civil Engineering
The Ohio State University

Dr. Keith W. Bedford
Department of Civil Engineering
The Ohio State University

CLASSIFICATION: Problem Area: P II B Research Area: R 2 a (2)
State Problem Priority Number: 1

DURATION: From: 10/01/77 To: 9/30/80

FUNDING: Federal: $27,454.48

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	M. E. Mossaad	Civil Engineering	Ph.D.
*	Kenneth L. McCurdy	Civil Engineering	M.S.
	E. M. Ali	Civil Engineering	Post-Ph.D.
	Ronald McOmber	Civil Engineering	B.S.

Dr. Mossaad is an Assistant Professor of Soil Mechanics at the Cairo University.

Mr. Kenneth McCurdy is a Soils Engineer for the firm of Benedict, Brown, Craig & Moos in Columbus, Ohio.

PUBLICATIONS:

Wu, T. H., K. W. Bedford, et al., 1981. "A Stochastic Model of Soil Erosion." Project Completion Report No. RF 711523, Water Resources Center, The Ohio State University, Columbus.

** Mossaad, M. E., 1981. "A Stochastic Model of Erosion." Ph. D. Dissertation, The Ohio State University, Columbus.

* McCurdy, K. L., 1984. "Impact Erosion of Cohesive Soils." M. S. Thesis, The Ohio State University, Columbus.

Wu, T. H., and Bedford, K. W., 1984. "A Stochastic Model of Soil Erosion." Internat. J. Numerical and Analytical Methods in Geomechanics 8:201-24.

PROJECT SUMMARY

NUMBER: A-057-OHIO

TITLE: BIOCLEANSING WITH AQUATIC WEEDS: A MEANS OF REMOVING ASBESTIFORM FIBERS FROM MUNICIPAL EFFLUENTS

PRINCIPAL INVESTIGATOR: Dr. Robert M. Pfister
Department of Microbiology
The Ohio State University

DURATION: From: 10/01/78 To: 3/31/81

CLASSIFICATION: Problem Area: P II A Research Areas: R 2 b (1) and (3)
State Problem Priority Number: 3

FUNDING: Federal: $21,214.92

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
* Robert J. Risner	Microbiology	M.S.

Dr. Robert J. Risner is a physician with an interest in respiratory diseases.

PUBLICATIONS:

Pfister, R. M., 1980. "Biocleansing with Aquatic Weeds: A Means of Removing Asbestiform Fibers from Water." Project Completion Report No. RF 712431, Water Resources Center, The Ohio State University, Columbus.

* Risner, R. J., 1980. "The Development and Cytological Effects of Common Serpentine and Amphibol Asbestos on Tomato Root Tips Grown in Culture." M. S. Thesis, The Ohio State University, Columbus.

PROJECT SUMMARY

NUMBER: A-058-OHIO

TITLE: MICROHABITAT SELECTION BY FISH: A RATIONAL FOR DEVELOPING DESIGN CRITERIA FOR MITIGATION DEVICES IN CHANNELIZED STREAMS

PRINCIPAL INVESTIGATOR: Dr. Roy A Stein
Department of Zoology
The Ohio State University

Dr. Robert F. Carline, Leader
Ohio Cooperative Fishery Unit
The Ohio State University

DURATION: From: 10/01/78 To: 3/31/81

FUNDING: Federal: $33,411.44

CLASSIFICATION: Problem Area: P IV D Research Area: R 2 b (2)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Carolyn W. Sechnick	Zoology	M.S.
*	Edward T. Rankin	Zoology	M.S.
	Susan Schaefer	Zoology	B.S.

Carolyn Sechnick is a Park Naturalist at the Fullersburg Woods Environmental Center at Oakbrook, Illinois.

Edward Rankin is a Fisheries Biologist with the Ohio EPA.

PUBLICATIONS:

Carline, R. F., and R. A. Stein, 1981. "Microhabitat Seection by Fish: A Rational for Developing Design Criteria for Mitigation Devices in Channelized Streams." Project Completion Report No. RF 712432, Water Resources Center, The Ohio State University, Columbus.

* Sechnick, C. W., 1980. "Microhabitat Selection by Smallmouth Bass in Simulated Stream Environments." M. S. Thesis, The Ohio State University, Columbus.

* Rankin, E. T., 1983. "Behavior and Microhabitat Use of Smallmouth Bass in the Flat River, Michigan." M. S. Thesis, The Ohio State University, Columbus.

Sechnick, C. W., R. F. Carline, and R. A. Stein, 1986. "Microhabitat Selection by Smallmouth Bass in a Simulated Stream Environment." Transactions of the American Fisheries Society.

Rankin, E. T., 1986. "Behavior and Microhabitat Use of Smallmouth Bass in the Flat River, Michigan." Transactions of the American Fisheries Society.

PROJECT SUMMARY

NUMBER: A-059-OHIO

TITLE: CHEMICAL STUDIES OF THE INTERSTITIAL WATER DISSOLVED ORGANIC MATTER AND GASES IN LAKE ERIE, CLEVELAND HARBOR AND HAMILTON HARBOUR BOTTOM SEDIMENTS - COMPOSITION AND FLUXES TO OVERLYING WATERS

PRINCIPAL INVESTIGATOR: Dr. Donald D. Adams
Department of Chemistry
Wright State University

Dr. George C. Hess
Department of Chemistry
Wright State University

DURATION: From: 10/01/78 To: 9/30/80

FUNDING: Federal: $29,079.00

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 1 b (5)
State Problem Priority Number: 1, 4, 7, 9

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	David A. Deis	Env. Science/Biology	M.S.
*	Nicholas Fendinger	Chemistry	M.S.
	Marilyn Hunsaker	Chemistry	M.S.
	Brad Luckenbill	Chemistry	B.S.

PUBLICATIONS:

Adams, D. D., and G. G. Hess, 1982. "Chemical Study of the Interstitial Water Dissolved Organic Matter and Gases in Lake Erie, Cleveland Harbor, and Hamilton Harbour Bottom Sediments - Composition and Fluxes to Overlying Waters." Project Completion Report No. RF 712433, Water Resources Center, The Ohio State University, Columbus.

* Deis, D. A., 1981. "Distribution of Dissolved and Particulate Organic Carbon in Sediments of Lake Erie and Two Polluted Harbors." M. S. Thesis, Wright State University, Dayton, Ohio.

* Fendinger, N. J., 1983. "Distributions and Related Fluxes of Dissolved Pore Water Gases (CH4, N2 and CO2) in the Sediments of Lake Erie and Two Polluted Harbors." M. S. Thesis, Wright State University, Dayton, Ohio.

Adams, D. D., N. J. Fendinger, and D. M. Parrish, 1980. "Occurrence of Carbon Monoxide in Recent Sediments of Lake Erie and Some Nearby Polluted Harbors." EOS Transactions, Amer. Geophysical Union 61:276.

PROJECT SUMMARY

NUMBER: A-060-OHIO

TITLE: MECHANISM OF SEMIFLUIDIZED BED BIOREACTOR FOR BIOLOGICAL PHENOL DEGRADATION

PRINCIPAL INVESTIGATOR: Dr. Liang-Shih Fan
Department of Chemical Engineering
The Ohio State University

DURATION: From: 10/01/79 To: 9/30/82

FUNDING: Federal: $35,479.00

CLASSIFICATION: Problem Area: P II A Research Areas: R 2 b (1) and (2)
State Problem Priority Number: 3

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Terry Chern	Chemical Engineering	Ph.D.
**	S-J Hwang	Chemical Engineering	Ph.D.
*	Anne Edwards	Chemistry	M.S.
*	W-T Tang	Chemical Engineering	M.S.
	Masayuki Toda	Chemical Engineering	Post Ph.D.

Dr. Chern is a Process Engineer for I. I. Dupont, and is working on wastewater treatment for a polymer processing plant.

Dr. Hwang is an Associate Professor of Chemical Engineering at the National Tsing-Hwa University in Taiwan.

Anne Edwards is a Process Engineer for Union Camp, Inc. in Princeton, N. J. where she is working on wastewater treatment from pulp paper processing.

W-T Tang is a Ph. D. Candidate in Chemical Engineering at OSU.

PUBLICATIONS:

Fan, L-S., 1983. "Mechanism of Semifluidized Bed Bioreactor for Biological Phenol Degradation." Project Completion Report No. RF 714438, Water Resources Center, The Ohio State University, Columbus.

** Chern, T., 1982. "Fundamentals of Three Phase Fluidized Bed for Wastewater Treatment." Ph. D. Dissertation, The Ohio State University, Columbus.

** Hwang, S-J., 1985. "Hydrodynamics and Mass Transfer of a Draft Tube Three Phase Fluidized Bed." Ph. D. Dissertation, The Ohio State University, Columbus.

* Edwards, A. M., 1980. "Biological Phenol Degradation in Packed Bed, Semifluidized Bed and Batch Reactor Systems." M. S. Thesis, The Ohio State University, Columbus.

* Tang, W-T., 1985. "Steady State and Transient Behavior of a Draft Tube Three Phase Fluidized Bed for Phenol Degradation." M. S. Thesis, The Ohio State University, Columbus.

Fan, L-S., S-H Chern, and K. Muroyama, 1984. "Solids Mixing in a Gas-Liquid-Solid Fluidized Bed Containing a Binary Mixture of Particles." AIChE Journal 30:(5):858-60.

Fan, L-S., A. Matsuura, and S. J. Hwang, 1984. "Some Remarks on Hydrodynamic Behavior of a Draft Tube Gas-Liquid-Solid Fluidized Bed." AIChE Symposium Series 234:(80):91-97.

Fan, L-S., K. Fujie, and T. R. Long, 1984. "Some Remarks on Gas-Liquid Mass Transfer and Biological Phenol Degradation in a Draft Tube Gas-Liquid-Solid Fluidized Bed Bioreactor." AIChE Symposium Series 241:(80):102-09.

PROJECT SUMMARY

NUMBER: A-061-OHIO

TITLE: THE SOURCE AND TRANSPORT OF ARSENIC IN NORTHEASTERN OHIO GROUNDWATERS

PRINCIPAL INVESTIGATOR: Dr. Gerald Matisoff
Department of Geology
and
Dr. John F. Hall
Department of Geology
Case Western Reserve University

DURATION: From: 10/01/79 To: 3/31/81

FUNDING: Federal: $12,760.00

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 1 b (5)
State Problem Priority Number: 1, 2, 3, 4

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
* Christopher Khourey	Geology	M.S.

Christopher Khourey is a District Groundwater Hydrologist for the Ohio EPA.

PUBLICATIONS:

Matisoff, G., C. J. Khourey, and J. F. Hall, 1981. "The Source and Transport of Arsenic in Northeastern Ohio Groundwaters." Project Completion Report No. RF 712435, Water Resources Center, The Ohio State University, Columbus.

* Khourey, C. J., 1981. "The Source and Transport of Arsenic in Northeastern Ohio Groundwaters." M. S. Thesis, Case Western Reserve University, Cleveland.

Strain, W. H., A. W. Varnes, G. Matisoff, and C. J. Khourey, 1980. "Arsenic in Drinking and household Water." In:M. Anke, H. J. Schneider, Chr. Brueckner, (eds.), Arsen 0 3rd Spurenelement Sumposium, Leipsiz and Jena, 83-89.

Matisoff, G., C. J. Khourey, J. F. Hall, A. W. Varnes, and W. H. Strain, 1982. "The Origin and Nature of Arsenic of Northeastern Ohio Groundwaters." Ground Water 20:446-456.

Khourey, C. J., G. Matisoff, W. H. Strain, and A. W. Varnes, 1983. "Toxic Metal Mobility in Ground Water Systems as Influenced by Acid Rain." Proc. Trace Substances in Environmental Health - XVII A Symposium (D. D. Hemphill, ed.), Columbia,174-180.

Khourey, C. J., et al., 1983. "Acid Rain and the Composition of Drinking Water from Ground Water Wells." Proc. International Conf. on Heavy Metals in Environment, Heidelberg,1266-1269.

PROJECT SUMMARY

NUMBER: A-062-OHIO

TITLE: SURFACE WATER CONTAMINATION BY INSECTICIDES: DATA FROM AQUATIC INSECT TESTS THAT PERTAIN TO WATER QUALITY CRITERIA

PRINCIPAL INVESTIGATOR: Dr. William J. Collins
Department of Entomology
The Ohio State University

DURATION: From: 10/01/79 To: 3/31/82

FUNDING: Federal: $19,949.12

CLASSIFICATION: Problem Area: P II B Research Area: R 1 b (5)
State Problem Priority Number: 1

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
** Richard L. Shank	Aquatic Ecology	Ph. D.

Dr. Richard L. Shank was formerly Manager, Surveillance and Monitoring Section, Division of Solid and Hazardous Wastes Management, OEPA and is now Research Scientist and Thrust Leader, Toxic and Hazardous Waste Section, Battelle Memorial Institute.

PUBLICATIONS:

Collins, W. J., and R. L. Shank, 1983. "Surface Water Contamination by Insecticides: Data from Aquatic Insect Tests that Pertain to Water Quality Criteria." Project Completion Report No. RF 713269, Water Resources Center, The Ohio State University, Columbus.

** Shank, R. L., 1984. "Effects of Season and Temperature on the Susceptibility of Stream Insects to a Common Organo-Phosphate Insecticide." Ph. D. Dissertation, The Ohio State University, Columbus.

PROJECT SUMMARY

NUMBER: A-063-OHIO

TITLE: A REMOTE SENSING TECHNIQUE FOR ESTIMATING WATERSHED RUNOFF

PRINCIPAL INVESTIGATOR: Professor Olin Mintzer
Department of Civil Engineering
The Ohio State University

DURATION: From: 10/01/79 To: 3/31/81

FUNDING: Federal: $5,996.65

CLASSIFICATION: Problem Area: P I B Research Area: R 2 a (1)
State Problem Priority Number: 5, 6

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Farid Askari	Civil Engineering	M.S.

PUBLICATIONS:

Mintzer, O., and F. Askari, 1980. "A Remote Sensing Technique for Estimating Watershed Runoff." Project Completion Report No. RF 712508, Water Resources Center, The Ohio State University, Columbus.

* Askari, F., 1980. "Automated Classification of Watershed Runoff Coefficients from LANDSAT Multispectral Data." M. S. Thesis, The Ohio State University, Columbus.

PROJECT SUMMARY

NUMBER: A-064-OHIO

TITLE: UTILIZATION OF OHIO RIVER SHALLOW WATER HABITATS BY YOUNG-OF-THE-YEAR FISHES

PRINCIPAL INVESTIGATOR: Dr. Theodore M. Cavender
Department of Zoology
The Ohio State University

DURATION: From: 10/01/80 To: 9/30/82

FUNDING: Federal: $11,020.00

CLASSIFICATION: Problem Area: P I A Research Area: R 2 a (3)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	George R. Carter	Zoology	M.S.
	Jeffrey Farwick	Zoology	B.S.
	Todd Jolliff	Zoology	B.S.

George Carter is an Environmental Scientist for the Ohio EPA.

Jeffrey Fenwick is an Assistant District Biologist for the Arkansas Department of Fish and Game.

PUBLICATIONS:

Carter, G. R., and T. M. Cavender, 1983. "Utilization of Ohio River Shallow Water Habitats by Young-of-the-Year Fishes." Project Completion Report No. RF 714443, Water Resources Center, The Ohio State University, Columbus.

* Carter, G. R., 1985. "A Comparison of Backwater and Mainstream Habitat Utilization by Young-of-the-Year Fishes in the Ohio River." M. S. Thesis, The Ohio State University, Columbus.

PROJECT SUMMARY

NUMBER: A-065-OHIO

TITLE: MANIPULATION OF TROPHIC DYNAMICS IN FISH HATCHERY PONDS

PRINCIPAL INVESTIGATOR: Dr. David A. Culver
Department of Zoology
The Ohio State University

DURATION: From: 10/01/80 To: 9/30/82

FUNDING: Federal: $34,681.00

CLASSIFICATION: Problem Area: P IV A Research Area: R 1 b (2)
State Problem Priority Number: 6

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Ralph M. Vaga	Zoology	Ph.D.
	Katharine Dillingham	Zoology	M.S.
	N. Hennessey	Zoology	M.S.
	J. Ridgeway	Zoology	M.S.
	Sally Blower	Zoology	B.S.

PUBLICATIONS:

Vaga, R. M., and D. A. Culver, 1984. "Trophic Ecology of Fish Rearing Ponds." Project Completion Report No. RF 714434, Water Resources Center, The Ohio State University, Columbus.

** Vaga, R. M., 1985. "Ecology and Production of Zooplankton in Fish Ponds." Ph. D. Dissertation, The Ohio State University, Columbus.

Culver, D. A., R. M. Vaga, and C. S. Munch, 1984. "Effect of Size-Selective Fish Predation on the Reproductive Output of Cladocera in Hatchery Ponds." Verhandlungen Internationale Vereinigung fur Theoretische und Angewandte Limnologie 22:1636-39.

Munch, C. S., R. M. Vaga, and D. A. Culver, 1983. "Evidence for Size-Selective Grazing of Phytoplankton Species by Zooplankton in Fish Hatchery Ponds." Verhandlungen Internationale Vereinigung fur Theoretische und Angewandte Limnologie 22:1640-44.

Vaga, R. M., D. A. Culver, and C. S. Munch, 1983. "The Fecundity Ratio of Large to Small Filter-Feeding Cladocerans as a Function of Inedible Algal Standing Crop." Verhandlungen Internationale Vereinigung fur Theoretische und Angewandte Limnologie 22:3072-75.

PROJECT SUMMARY

NUMBER: A-066-OHIO

TITLE: NITRATE CONTAMINATION OF SUBSURFACE WATERS IN AN URBANIZING AREA

PRINCIPAL INVESTIGATOR: Dr. Gerald Matisoff
Department of Geology
Case Western Reserve University

DURATION: From: 10/01/80 To: 3/31/83

FUNDING: Federal: $30,000.00

CLASSIFICATION: Problem Area: P II B Research Area: R 1 b (5)
State Problem Priority Number: 1

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
* Mark Inglis	Geology	M.S.
* Walter R. Kelly	Geology	M.S.

Mark Inglis is a Production Geologist, Water and CO2 Flooding, Chevron USA.

Walter R. Kelly is a Geology Hydrochemist for the Nuclear Regulatory Commission.

PUBLICATIONS:

Matisoff, G., J. M. Inglis, and W. R. Kelly, 1983. "Nitrate Contamination of Subsurface Waters in an Urbanizing Area." Project Completion Report No. RF 713266, Water Resources Center, The Ohio State University, Columbus.

* Inglis, J. M., 1982. "Nitrate Contamination in a Shallow, Unconfined Aquifer in Perry, Ohio." M. S. Thesis, Case Western Reserve University, Cleveland.

* Kelly, W. R., 1983. "The Effects of Methane Perterbation on the Chemistry and Quality of Ground Water Systems." M. S. Thesis, Case Western Reserve University, Cleveland.

PROJECT SUMMARY

NUMBER: A-067-OHIO

TITLE: SOME COMPONENTS OF SEDIMENT OXYGEN DEMAND IN LAKE ERIE SEDIMENTS

PRINCIPAL INVESTIGATOR: Dr. Peter L. McCall
Department of Geology
Case Western Reserve University

DURATION: From: 10/01/80 To: 3/31/83

FUNDING: Federal: $7,449.00

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 2 a (1)
State Problem Priority Number: 1, 4, 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	J. B. Fisher	Geology	Ph. D.
	Robert Finkelstein	Geology	M. A.

PUBLICATIONS:

Finkelstein, R., and P. L. McCall, 1983. "Some Components of Sediment Oxygen Demand in Lake Erie Sediments." Project Completion Report No. RF 714436, Water Resources Center, The Ohio State University, Columbus.

** Fisher, J. B., 1979. "Effects of Tubificid Oligochaetes on Sediment Movement and the Movement of Materials Across the Sediment-w ater Interface." Ph. D. Dissertation, Case Western Reserve University, Cleveland.

Adams, D. D., G. Matisoff, and W. J. Snodgrass, 1982. "Flux of Reduced Chemical Constitutents (Fe^{2+}, Mn^{2+}, NH_4^+ and CH_4) and Sediment Oxygen Demand in Lake Erie." Hydrobiologia 92:405-414.

McCall, P. L., and J. B. Fisher, 1982. "The Effects of Tubificid Oligochaetes on the Physical and Chemical Properties of Lake Erie Sediments." In: R. O. Brinkhrost, (ed.), Aquatic Oligochaete Biology, Plenum Press, N. Y.

McCall, P. L., and M. J. Tevesz, 1982. "Effects of Benthos on Physical Properties of Freshwater Sediments." In: P. L. McCall and M. J. Tevesz, (eds.), Annual Sediment Relations, pp. 105-176.

PROJECT SUMMARY

NUMBER: A-068-OHIO

TITLE: IRON SPECIATION IN ACID MINE EFFLUENTS: CHEMICAL AND MICROBIAL CONTROLS

PRINCIPAL INVESTIGATOR: Dr. Jerry M. Bigham
Department of Agronomy
The Ohio State University

Dr. Terry J. Logan
Department of Agronomy
The Ohio State university

Dr. Olie H. Tuovinen
Department of Microbiology
The Ohio State University

DURATION: From: 10/01/81 To: 9/30/83

FUNDING: Federal: $15,000.00

CLASSIFICATION: Problem Area: P II B Research Area: R 2 b (1)
State Problem Priority Number: 1, 4

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Karen Brady	Soil Science	Ph.D.
*	Nicholas Santoro	Microbiology	M.S.
*	Edward Lancy	Microbiology	M.S.

Dr. Karen Brady is an Administrator in the Environmental Quality Section of the Tennessee Valley Authority.

Nicholas Santoro is a Ph. D. Candidate at the University of Illinois.

Edward Lancy is a Ph. D. Candidate at the Case Western Reserve University.

PUBLICATIONS:

Bigham, J. M., O. H. Tuovinen, K. S. Brady, and T. J. Logan, 1984."Iron Speciation in Acid Mine Effluents: Chemical and Microbial Controls." Project Completion Report No. RF 714437, Water Resources Center, The Ohio State University, Columbus.

** Brady, K. S., 1982. "Iron Precipitates from Acid Coal Mine Drainage in Southeastern Ohio: Origin, Occurrence and Regional significance." Ph. D. Dissertation, The Ohio State University, Columbus.

* Lancy, E. D. Jr., 1983. "Ferrous Iron Oxidation by Thiobacillus ferrooxidans Immobilized in Calcium Alginate Matrix." M. S. Thesis, The Ohio State University, Columbus.

* Santoro, N., 1983. "Sulfate-Reducing Bacteria: Development of Culture Methodology, High-Performance Liquid Chromatographic Detection of Organic Acid Excretion and Characterization of the Pyrruvate Uptake System Under Fermentation and Respiratory Conditions." M. S. Thesis, The Ohio State University, Columbus.

Vuorinen, A., P. Hiltunen, J. C. Hsu, and O. H. Tuovinen, 1983. "Solubilization and Speciation of Iron During Pyrite Oxidation by Thiobacillus ferrooxidans." Geomicrobiol. J. 3:95-120.

DiSpirito, A. A., and O. H. Tuovinen, 1984. "Oxidation of Nonferrous Metals by Thiobacilli. In: W. R. Strohl and O. H. Tuovinen,(eds.), Microbial Chemoautotrophy, The Ohio State University Press, Columbus.

Lancy, E. D., and O. H. Tuovinen, 1984. "Ferrous Ion Oxidation by Thiobacillus ferrooxidans Immobilized in Calcium Alginate." Appl. Microbiol. Biotechnol. 20:94-99.

PROJECT SUMMARY

NUMBER: FY 83/84-02-OHIO

TITLE: OPTIMAL DESIGN OF A FLUIDIZED BED BIOREACTOR FOR TREATMENT OF WASTEWATER FROM COAL PROCESSING

PRINCIPAL INVESTIGATOR: Dr. Liang-Shih Fan
Department of Chemical Engineering
The Ohio State University

DURATION: From: 9/01/83 To: 9/30/85

FUNDING: Federal: $32,561.00

CLASSIFICATION: Problem Area: P II A Research Area: R 2 b (1)
State Problem Priority Number: 3, 8

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	S. J. Hwang	Chemical Engineering	Ph. D.
*	W. T. Tang	Chemical Engineering	M.S.
*	D. C. Arters	Chemical Engineering	M.S.
	F.Bavaruab	Chemical Engineering	M.S.
	Sunil Sitija	Chemical Engineering	Post-Ph.D.
	Kochi Fujie	Chemical Engineering	Post-Ph.D.

PUBLICATIONS:

** Hwang, S. J., 1985. "Hydrodynamics and Mass Transfer in a Draft Tube Gas-Liquid-Solid Spouted Bed." Ph. D. Dissertation, The Ohio State University, Columbus.

* Tang, W. T., 1985. "Steady State and Transient Phenol Biodegradation by Mixed Culture in a Draft Tube Three-Phase Fluidized Bed Bioreactor." M. S. Thesis, The Ohio State University, Columbus.

* Arters, D. C., 1984. "Solid-Liquid Mass Transfer in a Three-Phase Fluidized Bed." M. S. Thesis, The Ohio State University, Columbus.

Fan, L. S., S. H. Chern, and K. Muroyama, 1984. "Solids Mixing in a Gas-Liquid-Solid Fluidized Bed Containing a Binary Mixture of Particles." AIChE Journal 30:(5):858-860.

PROJECT SUMMARY

NUMBER: FY 83/84-03-OHIO

TITLE: DYNAMICS OF BIOAVAILABLE PHOSPHORUS IN LAKE ERIE AS RELATED TO PHOSPHORUS LOADING

PRINCIPAL INVESTIGATOR: Dr. Charles E. Herdendorf, Director
Center for Lake Erie Area Research
The Ohio State University

Dr. David E. Rathke, Research Associate
Center for Lake Erie Area Research
The Ohio State University

DURATION: From: 9/01/83 To: 9/30/85

FUNDING: Federal: $36,000.00

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 2 a (3)
State Problem Priority Number: 1, 4, 7

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
Cheng Mu Shiao	Electrical Engineering	Ph.D.
George Glaros	Zoology	B.S.
John Baker	Chemical Engineering	B.S.

PROJECT SUMMARY

NUMBER: FY 83/84-04-OHIO

TITLE: PREFERENCE OF FISH LARVAE FOR HABITAT TYPES IN A CONTROLLED LAKE ERIE WETLAND

PRINCIPAL INVESTIGATOR: Dr. David L. Johnson
School of Natural Resources
The Ohio State University

DURATION: From: 9/01/83 To: 9/30/85

FUNDING: Federal: $36,058.00

CLASSIFICATION: Problem Area: P I A Research Area: R 2 a (1)
State Problem Priority Number: 7

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
William Snyder	Natural Resources Fisheries	M.S.
John Navarro	Natural resources Fisheries	M.S.
Amy Twary	Natural Resources Fisheries	B.S.
John Miltner	Natural Resources Fisheries	B.S.
John Hageman	Natural Resources Fisheries	B.S.

PROJECT SUMMARY

NUMBER: FY 83/84-05-OHIO

TITLE: ALTERATION OF STREAM ECOSYSTEM FUNCTION AND STRUCTURE BY AGRICULTURAL HERBICIDES

PRINCIPAL INVESTIGATOR: Dr. Kenneth A. Krieger
Water Quality Laboratory
Heidelberg College

Dr. David B. Baker
Water Quality Laboratory
Heidelberg College

DURATION: From: 9/01/83 To: 9/30/85

FUNDING: Federal: $19,130.00

CLASSIFICATION: Problem Area: P II B Research Area: R 1 b (5)
State Problem Priority Number: 1, 7

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
James Holloway	Computer Science/Botany	B.S.
Kathryn Jones	Environmental Studies	B.S.

PROJECT SUMMARY

NUMBER: FY 83/84-06-OHIO

TITLE: MODELING OF TRANSPORT OF DISSOLVED PHOSPHATE FROM AGRICULTURAL LAND

PRINCIPAL INVESTIGATOR: Dr. Terry J. Logan
Department of Agronomy
The Ohio State University

DURATION: From: 9/01/83 To: 9/30/85

FUNDING: Federal: $27,580.00

CLASSIFICATION: Problem Area: P II B Research Area: R 2 b (1)
State Problem Priority Number: 1

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
Jung Jing	Agronomy	Ph.D.

PROJECT SUMMARY

NUMBER: FY 84-07-OHIO

TITLE: MEASUREMENT AND PARAMETERIZATION OF LAKE ERIE NEARSHORE TRANSPORT AND MIXING PROCESSES

PRINCIPAL INVESTIGATOR: Dr. Keith W. Bedford
Department of Civil Engineering
The Ohio State University

Dr. Scot Smith
Department of Civil Engineering
The Ohio State University

Dr. David E.Rathke, Research Associate
Center for Lake Erie Area Research
The Ohio State University

DURATION: From: 9/01/84 To: 9/30/85

FUNDING: Federal: $15,212.00

CLASSIFICATION: Problem Area: P I B Research Area: R 2 a (1)
State Problem Priority Number: 4, 7

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
Janet Murin	Civil Engineering	M.S.
Debbie Lee	Civil Engineering	M.S.

PROJECT SUMMARY

NUMBER: B-051-OHIO

TITLE: BACTERIAL CONTROL OF AQUATIC ALGAL POPULATIONS

PRINCIPAL INVESTIGATOR: Dr. Jeffrey C. Burnham
Department of Microbiology
Medical College of Ohio

DURATION: From: 7/01/73 To: 6/30/76

FUNDING: Federal: $50,000 Non-Federal: $68,208

CLASSIFICATION: Problem Area: P II Gen. Research Areas: R 2 b (1) and (3)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Donald Sun	Microbiology	Ph.D.
	Gregory Locher	Biology	M.S.

PUBLICATIONS:

Burnham, J. C., 1977. "Bacterial Control of Aquatic Algal Populations." Project Completion Report No. 548X, Water Resources Center, The Ohio State University, Columbus.

** Sun, D., 1976. "A Cytochemical and Physiological Study of Photosynthetic and Respiratory Electron Reduction Reactions in Blue-Green Algae." Ph. D. Dissertation, Medical College of Ohio and Bowling Green State University.

Burnham, J. C., D. Sun, and T. Stetak, 1975. "Biological Properties of Bdellovibrio-Produced Inhibition of Blue-Green Algae." Abs. Ann. Mtg. Am. Soc. Micro., G255.

Burnham, J. C., 1975. "Bacterial Control of Aquatic Algae." In: P. Brezonik, ed., Biological Control for Water Quality Enhancement, USEPA Symposium, Gainsville, Florida.

Fraleigh, P. C., J. C. Burnham, G. H. Gronau, and T. L. Kovacik, 1975. "Hydrology, Water Chemistry and Microbiology of Maumee Bay, Western Basin, Lake Erie." Abs. Int. Amer. Great Lakes Res., 18th Conference.

Sun, D. C., G. Locher, and J. C. Burnham, 1975. "Comparison of Photosynthetic Inhibition in Spheroplasts and Whole Cells of P. lurium." Abs. Ann. Mtg. Am. Soc. Micro., 171.

Fraleigh, P. C., J. C. Burnham, G. H. Gronau, T. L. Kovacik, and E. J. Tramer, 1975. "The Maumee Bay Environmental Quality Study - 1974." Final Report, Toledo-Lucas County Port Authority, 289 pages.

Kovacik, T. L., G. H. Gronau, P. C. Fraleigh, and J. C. Burnham, 1976. "Toledo Area River and Stream Water Quality Data Report, 1968 - 1974." University of Toledo, 188 pages.

Kovacik, T. L., G. H. Gronau, P. C. Fraleigh, and J. C. Burnham, 1976. "Water Quality Yrends of the Maumee River." Abs. Int. Assoc. Great Lakes Res., 19th Conference.

Burnham, J. C., G. Locher, and D. C. Sun, 1976."An Ultrastructural Analysis of Photosynthesic Stress in the Cyanobacteria, Phormidium lurium and Microcystis aeruginosa." Abs. Ann. Mtg. Am. Soc. Microbiology, I 113.

Burnham, J. C., and D. C. Sun, 197 . "Electron Microscopic Observations on the Interaction of Bdellovibrio bacteriovorus with Phormidium luridum and Microcystis aeruginosa." J. Phycology,

Burnham, J. C., G. Locher, and T. Stetak, 1976."Extracellular Lysis of the Blue-Green Algae, Phoridium luridum by Bdellovibrio bacteriovorus." J. Phycology, Volume 12, Number 3.

PROJECT SUMMARY

NUMBER: B-059-OHIO

TITLE: EFFECTS OF SPRAY IRRIGATION OF MUNICIPAL WASTEWATER ON NITROGEN TRANSFORMATIONS

PRINCIPAL INVESTIGATOR: Dr. Robert H. Miller
Department of Agronomy
The Ohio State University

Dr. Terry J. Logan
Department of Agronomy
The Ohio State University

DURATION: From: 7/01/74 To: 6/30/77

FUNDING: Federal: $29,168 Non-Federal Funds: $42,176.45

CLASSIFICATION: Problem Area: P II B Research Areas: R 2 b (1) and c (1)
State Problem Priority Number: 6

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
Shamsher Brar	Soil Microbiology	Post-Ph.D.
Allan Smith	Biology	M.S.
Terrance O'Hara	Social Work	M.S.

PUBLICATIONS:

Miller, R. H., S. S. Brar, and T. J. Logan, 1978. "Effect of Spray Irrigation of Municipal Wastewater on Nitrogen Transformations in Soil." Project Completion Report No. 495X, Water Resources Center, The Ohio State University, Columbus.

Brar, S.S., R. H. Miller, and T. J. Logan, 1978. "Some Factors Affecting Denitrification in Soils Irrigated with Wastewater." Jour. Water Poll. Control Fed., April, 709-717.

PROJECT SUMMARY

NUMBER: B-060-OHIO

TITLE: MICROORGANISMS CAPABLE OF DEGRADING REFRACTORY HYDROCARBONS IN OHIO WATERS

PRINCIPAL INVESTIGATOR: Dr. Joseph J. Cooney
Department of Microbiology
University of Dayton

DURATION: From: 7/01/74 To: 9/30/77

FUNDING: Federal: $66,769 Non-Federal: $66,796

CLASSIFICATION: Problem Area: P II A Research Area: R 2 b (1)
State Problem Priority Number: 3

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
	Lynne Broderick	Microbial Ecology	Post-Ph.D.
	George Roubal	Microbial Physiology	M.S.
	Sherry Flinchum	Microbial Physiology	Ph.D.
*	Susan Dieringer	Env. Microbiology	M.S.
*	Michael Griffin	Env. Microbiology	M.S.
	Paula Gustin	Env. Microbiology	B.S.
	Jennifer Requarth	Env. Microbiology	B.S.
	John Singer	Env. Microbiology	M.S.
*	Donald Singer	Microbial Physiology	M.S.
	Eric A. Beck	Env. Microbiology	M.S.
	Scott A. Silver	Microbial Physiology	Post-Ph.D.

Dr. Lynne Broderick is a faculty member in the Biology Department at SUNY.

George Roubal worked for a private water-testing laboratory and is now a doctoral candidate at the University of Louisville.

Dr. Sherry Flinchum recently received her Doctorate from OSU.

Susan Dieringer works in fermentation technology at the Detrick Cancer Research Center.

Dr. Michael Griffin received his doctorate from the University of Rhode Island and is employed in research by Standard Oil of Ohio in Cleveland.

Dr. John Singer received his doctorate from the University of Georgia and is employed in industry.

Donald Singer is a microbiologist at Chesbro-Ponds.

PROJECT B-060 SUMMARY (Continued)

PUBLICATIONS:

Cooney, J. J., 1980. "Microorganisms Capable of Degrading Refractory Hydrocarbons in Ohio Waters." Project Completion Report No. 493X, Water Resources Center, The Ohio State University, Columbus.

Dieringer, S., 1976. "Photo-Killing of Micrococcus roseus." M. S. Thesis, University of Dayton, Ohio.

Griffin, M., 1978. "Degradation of Model Hydrocarbons by Invertebrate Microorganisms." M. S. Thesis, University of Dayton, Ohio.

Singer, D., 1979. "Phosolipids of Micrococcus roseus." M. S. Thesis, University of Dayton, Ohio.

Broderick, L. S., and J. J. Cooney, 1982. "Emulsification of Hydrocarbons by Bacteria from Freshwater Ecosystems." In: Developments in Industrial Microbiology 23:39 pp. 425-434.

Cooney, J. J., S. A. Silver, and E. A. Beck, 1985. "Factors Influencing Hydrocarbon Degradation in Three Freshwater Lakes." Microb. Ecol.PS 11:127-137.

Griffin, W. M., and J. J. Cooney, 1979. "Degradation of Model Recalcitrant Hydrocarbons by Microorganisms from Freshwater Ecosystems." In: Developments in Industrial Microbiology 20:44 pp. 479-488.

PROJECT SUMMARY

NUMBER: B-062-OHIO

TITLE: HIERARCHICAL MODELING FOR THE PLANNING AND MANAGEMENT OF A TOTAL REGIONAL WATER RESOURCE SYSTEM: JOINT CONSIDERATION OF THE SUPPLY AND QUALITY OF GROUND AND SURFACE WATER RESOURCES

PRINCIPAL INVESTIGATOR: Dr. Yacov Y. Haimes
Department of Systems Engineering
Case Western Reserve University

DURATION: From: 7/01/74 To: 6/30/76

FUNDING: Federal: $50,000 Non-Federal Funds: $55,969.41

CLASSIFICATION: Problem Area: P I Gen. Research Area: R 2 a (2)
State Problem Priority Number: 6, 10

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Yosef Dreizen	Systems Engineering	Ph.D.
**	Prasanta Das	Systems Engineering	Ph.D.
*	Asok Sarkar	Electrical Engineering	M.S.
	Cesar Bocanegra	Civil Engineering	M.S.
	Hernan G. Lopez	Systems Engineering	M.S.
**	Kai Sung	Systems Engineering	Ph.D
**	Michael A. Kaplan	Systems Engineering	Ph.D.

Y. C. Dreizen is Director, Division of Strategic Planning, Mekorot Water Limited, Israel.

P. Das joined the University of Virginia faculty and is presently in India.

A. Sarkar is working with an engineering consulting firm.

H. Lopez joined the faculty at the University of Los Andes in Venezuela.

K. Sung is Chairman, Department of Information Management, National Sun Yat-Sen University, Formosa.

PUBLICATIONS:

Haimes, Yacov, 1975. "Hierarchical Management of Ground and Surface Water Systems Via the Multicell Approach." Interim Project Report, Water Resources Center, The Ohio State University, Columbus.

Haimes, Y. Y., P. Das, and K. Sung, 1979. "Multiobjective Analysis in the Maumee River Basin: A Case Study." Final Project Completion Report submitted to the Office of Water Research and Technology and the National Science Foundation.

** Dreizin, Y. C., 1975. "Applications of the Superposition Approach to the Modeling and Management of Ground and Surface Water Resources." Ph. D. Dissertation, Case Western Reserve University, Cleveland.

** Kaplan, M. A., 1975. "Multiobjective Analysis in Regional Planning of Water and Related Land Resources Systems." Ph. D. Dissertation, Case Western Reserve University, Cleveland.

** Das, P., 1976. "Hierarchical-Multiobjective Approach in the Planning and Management of Water and Related Land Resources." Ph. D. Dissertation, Case Western Reserve University, Cleveland.

** Sung, K., 1978. "Mulyiobjective Optimization and Hierarchical Overlapping Coordination in Water Resources Systems." Ph. D. Dissertation, Case Western Reserve University, Cleveland.

* Sarkar, A., "Identification of Distributed Parameter Systems," M. S. Thesis, Case Wester Reserve University, (1975).

Yu, W., and Y. Y. Haimes, 1973. "Multilevel Optimization for Conjunctive Use of Ground and Surface Water." IEEE Transactions on Systems, Man, and Cybernetics, Vol. SMC-3, No. 4, pp. 396-402.

Maddock, T. III, and Y. Y. Haimes, 1975. "A Tax System for the Planning and Management of Groundwater." Water Resources Research, Vol. 11, No.1, pp. 7-14.

Lopez, H., Y. Y. Haimes and P. Das, 1976. "Nonlinear Estimation of Distributed Parameters of Groundwater Systems." Journal of Hydroloy, Vol. 30, No. 1, pp.47-61.

Dreizin, Y. C., and Y. Y. Haimes, 1977. "A Hierarchy of Response Functions for Groundwater Management." Water Resources Research, Vol. 13, No. 1, pp.78-86.

Haimes, Y. Y., and Y. C. Dreizin, 1977. "Management of Ground and Surface Water Systems Via Decomposition." Water Resources Research, Vol. 13, No. 1, pp.69-77.

Haimes, Y. Y., 1977. Hierarchical Analyses of Water Resources Systems: Modeling and Optimization of Large Scale Systems. McGraw-Hill International, New York.

Das, P., and Y. Y. Haimes, 1980. "Multiobjective Optimization in Water Quality and Land Management." Water Resources Research, Vol. 15, No.6, pp.1313-1322.

PROJECT SUMMARY

NUMBER: B-063-OHIO

TITLE: THE PREDICTIONS OF NUTRIENT, OXYGEN, ALGAE AND SLUDGE DISTRIBUTION IN A STATIFIED, EUTROPHIC LAKE

PRINCIPAL INVESTIGATOR: Dr. Keith W. Bedford
Department of Civil Engineering
The Ohio State University

Dr. Robert M. Sykes
Department of Civil Engineering
The Ohio State University

DURATION: From: 7/01/75 To: 12/31/77

FUNDING: Federal: $38,911 Non-Federal: $38,912

CLASSIFICATION: Problem Area: P I B Research Area: R 2 a (1)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	C. Babajimopolous	Civil Engineering	Ph.D.
**	Kenneth Smarkel	Civil Engineering	Ph.D.
	Alan Rozich	Civil Engineering	M.S.
	Michael Trimeloni	Civil Engineering	B.S.
	Daniel O'Loughlin	Civil Engineering	B.S.
	Igbal Rai	Civil Engineering	Post-Ph.D.

Dr. Kenneth Smarkel is with the State Water Quality Control Board in California.

Dr. Alan Rozich is on the faculty in the Civil Engineering Department at the University of Delaware.

PUBLICATIONS:

Bedford, K. W., R. M. Sykes, and C. Babajimopolous, 1978. "The Turbulent Transport and Biological Structure of Eutrophication Models - Volume 1." Project Completion Report No. 527X, Water Resources Center, The Ohio State University, Columbus.

Sykes, R. M., K. W Bedford, and K. M. Smarkel, 1978. "The Turbulent Transport and Biological Structure of Eutrophication Models - Volume 2." Project Completion Report No. 527X, Water Resources Center, The Ohio State University, Columbus.

** Babajimopoulos, C., 1978. "The Preservation of the Statistical Structure in Turbulent Lake Transport Systems." Ph. D. Dissertation, The Ohio State University, Columbus.

** Smarkel, K. L., 1978. "Comparative Study of the Mathematical Formulations for Primary Productivity in Stratified Lakes." Ph. D. Dissertation, The Ohio State University, Columbus.

Bedford, K. W., and I. Rai, 1978. "Efficient Pressure Solutions foe Circulation Predictions." ASCE Journal of Hydraulics 103:HY6.

Babajimopolos, C., and K. W. Bedford, 1980. "Formulating Lake Models Which Preserve Spectral Statistics." ASCE Journal of Hydraulics 106:HY1.

Bedford, K. W., and C. Babajimopolos, 1980. "Verfying Lake Models with Spectral Statistics." ASCE Journal of Hydraulics 106:HY1.

PROJECT SUMMARY

NUMBER: B-065-OHIO

TITLE: FATE OF TRACE ELEMENTS IN SEWAGE-AMENDED SOILS

PRINCIPAL INVESTIGATOR: Dr. Charles J. Ritter
Department of Geology
The University of Dayton

Dr. Charles R. Cothern
Department of Physics
The University of Dayton

DURATION: From: 7/01/75 To: 3/31/78

FUNDING: Federal: $39,872 Non-Federal: $39,872

CLASSIFICATION: Problem Area: P IV C Research Area: R 1 b (5)
State Problem Priority Number: 3, 6

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Peter M. Brown	Biology	M.S.
	Steve Bergman	Geology	B.S.
	Mary M. Bergman	Medical Technology	B.S.
	Mary Rita Dominic	Chemistry	B.S.
	Richard Grote	Physics	B.S.
	Reinhold Stenat	Electrical Engineering	B.S.
	Mary B. Schlereth	Mechanical Engineering	B.S.

PUBLICATIONS:

Ritter, C. J., C. R. Cothern, and E. E. Zamierowski, 1978. "Fate of Trace Elements in Sewage Sludge-Amended Soils," Project Completion Report No. 519X, Water Resources Center, The Ohio State University.

* Brown, P. R., 1978. "Uptake and Distribution of Cadmium in Beta vulgris (Sugar Beet) from Sludge-Amended Soil." M. S. Thesis, The University of Dayton.

Cothern, C. R., R. F. Grote, W. E. Moddeman, C. J. Ritter, and E. E. Zamierowski, 1977. "Compounds of Zinc and Copper in Sewage Sludge Determined by Electron Spectroscopy." J. Environ. Qual. 6:165-168.

Ritter, C. J., S. C. Bergman, E. E. Zamierowski, and C. R. Cothern, 1978. "Comparison of Sample Preparation Techniques for Atomic Adsorption Analysis of Sewage Sludge and Soil." At. Absorp. Newsl. 17:70-72.

Bergman, S. C., C. J. Ritter, E. E. Zamierowski, and C. R. Cothern, 1979. "The Use of Zonal Centrifugation in Delineating Trace Element Distribution in Sewage Sludges from the Dayton, Ohio Area." J. Environ. Qual., 8:416-422.

Ritter, C. J., 1982. "The Dry-Ashing Method of Preparing Sewage Sludge for Cd and Pb Determinations by AAS. American Laboratory 14(8):72-73.

Ritter, C. J., and S. M. Reinfierd, 1983. "Natural Background and Pollution Levels of Some Heavy Metals in Soils from the Area of Dayton, Ohio." Environ. Geol. 5:2:73-78.

Brown, P. H., E. E. Zamierowski, C. J. Ritter, and C. R. Cothern, 1978. "Effects of Crop Growth on Changes of Heavy Metal Extractability from a Soil Amended with Cd-enriched Sewage Sludge." Presented at 87th Annual Meeting of the Ohio Academy of Science.

PROJECT SUMMARY

NUMBER: B-071-OHIO

TITLE: RESTORATION OF TROUT POPULATIONS IN MARGINAL WATERS

PRINCIPAL INVESTIGATOR: Dr. Joseph F. Koonce
Department of Biology
Case Western Reserve University

Dr. M. Teraguchi
Department of Biology
Case Western Reserve University

DURATION: From: 10/01/76 To: 9/30/78

FUNDING: Federal: $50,000 Non-Federal: $50,000

CLASSIFICATION: Problem Area: P I A Research Area: R 2 b (3)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
*	Jeffrey Penney	Biology	M.S.
	Louise Roslansky	Ecology	M.S.
	Susan Kauffman	Remote Sensing	B.S.

Dr. Jeffrey Penney is a Medical Doctor in Cincinnati, Ohio.

Louise Roslansky is a high school biology and math teacher in Massachusetts.

Susan Kauffman is a Ph.D. candidate in California. Her Masters is in Biology.

PUBLICATIONS:

Koonce, J. K., and M. Teraguchi, 1980. "The Effects of Siltation on Embryonic Mortality of Trout." Project Completion Report No. 544X, Water Resources Center, The Ohio State University, Columbus.

* Penney, J.,1980. "Territoriality in Relation to Spacing Behavior in Population Regulation to Spawning Dynamics of a Pond." M. S. Thesis, Case Western Reserve University, Cleveland.

PROJECT SUMMARY

NUMBER: B-072-OHIO

TITLE: BACTERIAL CONTROL OF AQUATIC ALGAE - PHASE II

PRINCIPAL INVESTIGATOR: Dr. Jeffrey C. Burnham
Department of Microbiology
Medical College of Ohio

DURATION: From: 10/01/76 To: 9/30/80

FUNDING: Federal: $103,645 Non-Federal: $129,185

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 2 b (1) and (3)
State Problem Priority Number: 7

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
Gregory Locher	Biology	M.S.

PUBLICATIONS:

Burnham, J. C., 1981. "Bacterial Control of Aquatic Algal Populations - Phase II." Project Completion Report No. RF 529028, Water Resources Center, The Ohio State University, Columbus.

Burnham, J. C., G. Locher and B. Highison, 1979. "Physological and Ultrastructural Changes in Phormidium luridum Induced by Exposure to Bacterial Toxins and Thermal Stress." Micron, 10:33-34.

Burnham, J. C., S. A. Collart and B. W. Highison, 1981. "Entrapment and Lysis of the Cyanobacterium Phormidium luridum by Colonial Spherules of Myxococcus xanthus PCO2." Arch. Microbiol. 129:285-294.

Burnham, J. C., 1981. "The Utilization of Bacteria in Managing Cyanobacterial Populations: A Review and Update." Proceedings of the 1980 USEPA Conference on Algal Control and Management, Asilomar, California. pp. 230-258.

Kovacik, T. L., G. H. Gronau, P. C. Fraleigh, and J. C. Burnham, 1981. "Toledo Area River and Stream Water Quality Data Report 1975-1980." Toledo Environmental Services Agency.

Burnham, J. C., 1980. "Myxobacterial Entrapment and Lysis of Aquatic Cyanobacteria." Second International Symposium on Microbial Ecology, Warwick, England.

PROJECT SUMMARY

NUMBER: B-073-OHIO

TITLE: INHIBITION OF MICROBIOLOGICAL ACID PRODUCTION IN COAL MINE REFUSE AND STRIP MINE SPOILS

PRINCIPAL INVESTIGATOR: Dr. Patrick R. Dugan
Department of Microbiology
The Ohio State University

DURATION: From: 10/01/77 To: 9/30/79

FUNDING: Federal: $35,185.82 Non-Federal: $37,731.99

CLASSIFICATION: Problem Area: P II B Research Area: R 2 b (l)
State Problem Priority Number: l

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
Lynn Apel	Microbiology	M. S.

Lynn Apel is with the USEPA Laboratory in Cincinnati, Ohio

PUBLICATIONS:

Dugan, P. R., 1984. "Prevention of the Formation of Acid Drainage from High Sulfur Coal, Coal Refuse and Coal Spoils by Inhibition of Iron and Sulfur Oxidizing Microorganisms." Project Completion Report No. RF 710708, Water Resources Center, The Ohio State University.

PROJECT SUMMARY

NUMBER: B-076-OHIO

TITLE: ADSORPTION OF ANIONIC AND CATIONIC METALS BY NON-IONIC POLYMETRIC RESINS

PRINCIPAL INVESTIGATOR: Dr. Alan J. Rubin
Department of Civil Engineering
The Ohio State University

DURATION: From: 10/01/78 To: 9/30/81

FUNDING: Federal: $65,000 Non-Federal: $67,025.73

CLASSIFICATION: Problem Area: P I A Research Area: R 2 b (1)
State Problem Priority Number: 3, 4

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Bruce Vigon	Environmental Chemistry	Ph.D.
	Robert Thompson	Civil Engineering	B.S.
*	Wayne Wargo	Environmental Chemistry	M.S.
*	Dale Kocarek	Civil Engineering	M.S.

Dr. Bruce Vigon is a Research Scientist at Battelle Memorial Institute.

Wayne Wargo initially was in the OEPA Water Quality Laboratory, but now works for Ross Laboratorys, Inc.

Dale Kocarek is a Project Engineer for the OEPA.

PUBLICATIONS:

Rubin, A. J., and, W. F. Wargo, 1982. "Adsorption of Anionic and Cationic Metals by Non-Ionic Polymetric Resins." Project Completion Report No. RF 711616, Water Resources Center, The Ohio State University.

* Wargo, W. F., 1981. "Adsorption of Anionic and Cationic Metals by Non-Ionic Resins." M. S. Thesis, The Ohio State University, Columbus.

* Kocarek, D. E., 1982. "Adsorption of Phenol by Carbonaceous Solids in Batch and Continuous Culture." M. S. Thesis, The Ohio State University.

PROJECT SUMMARY

NUMBER: B-078-OHIO

TITLE: TRANSPORT PROPERTIES OF THE GREAT LAKES SEICHE-AFFECTED RIVER MOUTHS

PRINCIPAL INVESTIGATOR: Dr. Keith W. Bedford
Department of Civil Engineering
The Ohio State University

Dr. Charles E. Herdendorf, Director
Center for Lake Erie Area Research
The Ohio State University

Dr. William Mattox
Division of Water
Ohio Department of Natural Resources

DURATION: From: 3/01/79 To: 9/30/82

FUNDING: Federal: $120,476 Non-Federal: $

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 1 a (2)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	Youssef Dakhoul	Civil Engineering	Ph.D.
**	H. Valizadeh	Civil Engineering	Ph.D.
*	Douglas J. Cosler	Civil Engineering	M.S.
*	Michael Worthy	Civil Engineering	M.S.
*	Mark D. Prater	Civil Engineering	M.S.
*	Daniel Lindsay	Civil Engineering	M.S.
*	Robert Van Evra	Civil Engineering	M.S.
*	Lester D. Fischer	Civil Engineering	M.S.
	Gary Lockwood	Civil Engineering	Ph.D.
	Charles Libicki	Geology/Civil Engr.	Ph.D.
	M. Abdelrahman	Civil Engineering	Ph.D.

PUBLICATIONS:

Bedford, K. W., D. Lindsay, W. Mattox, and C. E. Herdendorf, 1984. "A Review of Estuary Hydraulics and Transport as Applied to Rivers Tributary to Lake Erie." Project Completion Report No. RF 711846, Vol. 1, Water Resources Center, The Ohio State University, Columbus.

Bedford, K. W., M. Worthy, W. Mattox, and C. E. Herdendorf, 1984. "Littoral Drift Processes at Estuary Mouths - A Case Study at Old Women Creek in Lake Erie." Project Completion Report No. RF 711846, Vol. 2, Water Resources Center, The Ohio State University, Columbus.

Bedford, K. W., L. Fischer, W. Mattox, and C. E. Herdendorf, 1984. "A Laterally Averaged Model of Momentum and Energy Transport with Application to Seiche Hydraulics." Project Completion Report No. RF 711846, Vol. 3, Water Resources Center, The Ohio State University, Columbus.

Bedford, K. W., M. Prater, W. Mattox, and C. E. Herdendorf, 1984. "The Effect of Lake Erie/Sandusky Bay Seiche Oscillations on the Formulation of Sandusky Bay." Project Completion Report No. RF 711846, Vol. 4, Water Resources Center, The Ohio State University, Columbus.

** Dakhoul, Y. M., 1983. "Improved Averaging Method for Turbulent Flow Simulation." Ph. D. Dissertation, The Ohio State University.

** Valizadeh, H., 1983. "Pattern Analysis of Benthic Boundary Layer Momentum and Sediment Transport." Ph. D. Dissertation, The Ohio State University.

* Cosler, D. J., 1979. "Numerical Simulation of Turbulence in a Wind Driven Shallow Water Lake." M. S. Thesis, The Ohio State University.

* Worthy, M., 1979. "A Stability Study of the Old Woman Creek River Mouth." M. S. Thesis, The Ohio State University.

* Prater, M. D., 1980. "The Effect of Basin Oscillations on the Formation of Sandusky Bay." M. S. Thesis, The Ohio State University.

* Lindsay, D. A., 1981. " A Review of Estuary Hydraulics and Related Coastal Processes; Application to the Rivers Entering Lake Erie." M. S. Thesis, The Ohio State University.

* Van Evra, R. E. III, 1983. "Coastal Data Acquisition and Retrieval Tower (CDART)." M. S. Thesis, The Ohio State University.

* Fischer, L. D., 1983. "Development and Numerical Solution of Laterally Averaged Equations of Momentum and Energy Transport for Estuary Hydraulics: Applications to Seiche Affected Streams." M. S. Thesis, The Ohio State University.

Bedford, K., 1981. "Spectra Preservation Capabilities of Great Lakes Transport Models." In: Hugo Fischer, ed., Predictive Abilities of Surface Water Flow and Transport Models, Academic Press.

Bedford, K., and H. Valizadeh, 1981. "A Review of Coherent Turbulent Structures and Sediment Resuspension." LAGLER-1981.

PROJECT SUMMARY

NUMBER: B-079-OHIO

TITLE: EVALUATION OF BACTERIAL BINDING AND RELEASE OF CADMIUM FROM AQUATIC SEDIMENTS

PRINCIPAL INVESTIGATOR: Dr. Robert M. Pfister
Department of Microbiology
The Ohio State University

DURATION: From: 10/01/79 To: 3/30/82

FUNDING: Federal: $29,262 Non-Federal: $

CLASSIFICATION: Problem Area: P II A Research Areas: R 1 b (1) and (5)
State Problem Priority Number: 3

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
**Jeffrey Titus	Microbiology	Ph. D.

PUBLICATIONS:

Pfister, R. M., 1982. "Evaluation of Bacterial Binding and Release of Cadmium from Aquatic Sediments." Project Completion Report No. RF 712437, Water Resources Center, The Ohio State University, Columbus.

** Titus, J., 1981. "Interactions of Cadmium with Bacillus subtilis and with Natural Bacterial Populations." Ph. D. Dissertation, The Ohio State University, Columbus.

Titus, J. A., and R. M. Pfister, 1982. "Effects of pH, Temperature and Eh on the Uptake of Cadmium by Bacteria and an Artificial Sediment." Bull. Environ. Cont. Toxicol. 28(6):697-704.

Titus, J. A., and R. M. Pfister, 1983. "Bacteria and Cadmium Interactions in Natural and Laboratory Model Systems." Archives of Environmental Contamination and Toxicology 13:271-277.

Luli, G. W., J. W. Talnagi, W. R. Strohl, and R. M. Pfister, 1983. "Hexavalent Chromium-Resistant Bacteria Isolated from River Sediments." Applied and Environmental Microbiology 46:846-854.

Surowitz, K. G., J. A. Titus, and R. M. Pfister, 1984. "Effects of Cadmium Accumulation on Growth and Respiration of a Cadmium-Sensitive Strain of Bacillus subtilis and a Selected Cadmium Resistant Mutant." Arch. Microbiol. 140:107-112.

PROJECT SUMMARY

NUMBER: B-080-OHIO

TITLE: EFFECTS OF PHOSPHATE FERTILIZER APPLICATIONS AND THE CHEMISTRY-MINERALOLOGY OF THE IRON OXIDE SYSTEM ON PHOSPHATE ADSORPTION-DESORPTION BY STREAM SEDIMENTS

PRINCIPAL INVESTIGATOR: Dr. Terry J. Logan
Department of Agronomy
The Ohio State University

Dr. Jerry Bigham
Department of Agronomy
The Ohio State university

DURATION: From: 10/01/79 To: 3/31/82

FUNDING: Federal: $36,544 Non-Federal: $37,206

CLASSIFICATION: Problem Area: P II B Research Area: R 1 b (5)
State Problem Priority Number: 1

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM
Saratachandra Nair	Soil Science	Ph.D.(Deceased)
Karen Brady	Soil Science	Ph.D.
Jerry Miller	Soil Science	Ph.D.
Jung Jing	Soil Science	Ph.D.
H. Esmaeilzadeh	Soil Science	Ph.D.

PUBLICATIONS:

Logan, T. J., J. M. Bigham, K. S. Brady and P. S. Nair, 1982. "Effects of Phosphate Fertilizer and Chemistry-Mineralogy of the Iron Oxide System on Phosphate Adsorption-Desorption by Stream Sediments." Project Completion Report No. RF 712429, Water Resources Center, The Ohio State University, Columbus.

Nair, P. S., T. J. Logan, A. N. Sharpley, L. E. Sommers, M. A. Tabatabai, and T. L. Yuan, 1984. "Interlaboratory Comparison of a Standardized Phophorus Adsorption Procedure." J. Environ. Qual. 13:591-595.

Brady, K., J. M. Bigham and T. J. Logan, 1981. "Influence of Acid Mine Drainage on Water and Sediment Quality in Southeast Ohio." ASA Annual Meetings, Agron. Abs., p. 57.

Nair, S. P., and T. J. Logan, 1981. "Inter-Lab Evaluation of a Standardized Phosphate Adsorption Procedure." ASA Annual Meetings, Agron. Abs., p. 31.

Logan, T. J., 1982. "Effects of Current and Residual Fertilization on Losses of Soluble and Particulate Phosphate in Runoff and Tile Drainage." ASA Annual Meetings, Agron. Abs., p. 33.

Miller, J. W., T. J. Logan, and J. M. Bigham, 1982. "Orthophosphate Specific Adsorption and Kinetics on a Synthetic Oxide Surface by pH-Stat Titration." ASA Annual Meetings, Agron. Abs., p. 178.

Miller, J. W., and T. J. Logan, 1983. "The Specific Sorption Kinetics of Phosphorus at Variable Charge Surfaces." ASA Annual Meetings, Agron. Abs., p. 149.

PROJECT SUMMARY

NUMBER: B-084-OHIO

TITLE: BACTERIAL METHOGENESIS AND DENITRIFICATION IN CLEVELAND HARBOR AND LAKE ERTE

PRINCIPAL INVESTIGATOR: Dr. James I. Frea
Department of Microbiology
The Ohio State University

DURATION: From: 10/01/79 To: 3/31/83

FUNDING: Federal: $65,434.13 Non-Federal: $80,275.85

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 1 a (2)
State Problem Priority Number: 7

STUDENT TRAINING:

	NAME	DISCIPLINE	PROGRAM
**	R. E. Corder	Microbiology	Ph.D.
	Anthony Toonen	Microbiology	M.S.
	Victoria Mitton	Microbiology	M.S.

PUBLICATIONS:

Corder, R. E., L. A. Hook, J. M. Larkin, and J. I. Frea, 1983. "Isolation and Characterization of Two New Methane-Producing Cocci: Methanogenium olentangyi, sp.nov., and Methanococcus deltae, sp. nov." Arch. Microbiol. 134:28-32.

Frea, J. I., 1984. "Methogenisis: Its Role in the Carbon Cycle." In: (W.R. Strohl and O. H. Tuovinen, eds.) Microbial Chemoautotrophy, The Ohio State University Press, Columbus.

Hook, L. A., R. E. Corder, P. T. Hamilton, J. I. Frea, and J. N. Reeve, 1984. "Development of a Plating System for Genetic Exchange Studies in Methanogens Using a Modified Ultra-Low Oxygen Chamber." In: (W.R. Strohl and O. H. Tuovinen, eds.) Microbial Chemautotrophy, The Ohio State University Press, Columbus.

** Corder, R. E., 1982. "The Development of an Integrated Anaerobic System for the Cultivation and Characterization of Methanogenic Bacteria." Ph. D. Dissertation, The Ohio State University.

PROJECT SUMMARY

NUMBER: B-086-OHIO

TITLE: USE OF MYXOCOCCUS PCO2 TO CONTROL AQUATIC ALGAE

PRINCIPAL INVESTIGATOR: Dr. Jeffrey C. Burnham
Department of Microbiology
The Medical College of Ohio

DURATION: From: 9/01/79 To: 3/31/83

FUNDING: Federal: $77,797 Non-Federal: $93,211

CLASSIFICATION: Problem Area: P II Gen. Research Area: R 2 b (1)
State Problem Priority Number: 7

STUDENT TRAINING:

NAME	DISCIPLINE	PROGRAM

PUBLICATIONS:

Burnham, J. C., 1984. "Use of Myxococcus PCO2 to Control Aquatic Algae." Project Completion Report No. RF 712267, Water Resources Center, The Ohio State University, Columbus.

Burnham, J. C., S. A. Collart, and M. J. Daft, 1984. "Myxobacterial Predation of the Cyanobacterium Phormidium luridum in Aqueous Environments." Arch. Microbiol. 137:220-225.

Burnham, J. C., and P. C. Fraleogh, 1983. "Predatory Myxobacteria: Lytic Mechanisms and Prospects as Biological Control Agents for Cyanobacteria (Blue-Green Algae). In: (J. Taggert, ed.) Lake Restoration, Protection and Management. USEPA Symposium Volume EPA 440/5-83-001. pp. 249-256.

Daft, M. C., J. C. Burnham, and Y. Yamamoto, 1985. "Algae Blooms: Consequences, and Potential Cures." J. Appl. Bacteriol. In press.